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# USSR Report

TRANSPORTATION

No. 110

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AIR

## AIRCRAFT SERVICING NEEDS GREATER MECHANIZATION, BETTER ORGANIZATION

### Defects Cited ; Mechanization Urged

Moscow VOZDUSHNYY TRANSPORT in Russian 14 Dec 82 p 2

[Article by A. Nikitin, deputy chief, GUERAT: "Raise the Level of Mechanization!"]

[Text] It is not a new idea to think that successful fulfillment of production plans by the sector and performance of the complex tasks of aviation service to the national economy depend directly on the level of servicing of the aircraft. It is perfectly obvious that it can only be good if there is a high level of mechanization.

Work on the problems of mechanizing the processes of aircraft servicing took on a purposeful nature in the sector in the early 1970's. More than 35 new types of ground equipment were put into use at this time. The economic impact from introduction of the first industrial batches of the various machines was 2.4 million rubles. What kind of equipment was this? There were airport tractors, heaters and airconditioners, special vehicles, washing machines, and much more. Their introduction greatly raised the level of mechanization at airports and made many labor-intensive processes easier.

Generally speaking, definite progress has been made in this area. But there is no reason to become complacent. The point is that a significant number of the types of equipment that were developed and introduced are simply not being produced in series. And this leads to obsolescence of the machines even before they appear in use. In the second place, many of the most labor-intensive processes still have not been mechanized. Among them are washing aircraft, cleaning cockpits, removing ice coatings, and degassing the aircraft of PANKh's [possibly national economic aviation enterprises].

In addition, the infatuation of scientists and designers with building mobile mechanized means, usually with motor vehicle chassis, led to new difficulties in operational forms of servicing. The aircraft was literally surrounded by special vehicles and it was hard for them to pull in and out. The air becomes polluted from a large number of machines working at the site at once, and there is a great deal of noise. Finally, the more special vehicles there are on the platforms the more often (and statistics confirm this) aircraft are damaged on the ground. But practically no one in the sector is working on building permanent aircraft technical servicing systems, except for fuel and electricity supply.

Important questions are sometimes not decided in a comprehensive manner, which leads to undesirable results. An example could be operations to remove ice and wash airplanes. We know that when an airplane is exposed to a stream of exhaust gases from aircraft engines that have used up their service lives, products of fuel combustion are introduced into the coats of paint. But when the airplane is washed they cannot be removed either with hand brushes or by machine. The lack of coordination among studies and recommendations has led, as we see, to a situation where one operation has essentially made another more complicated.

Small-scale mechanization offers great opportunities for reducing the labor-intensiveness of technical servicing. Unfortunately, small mechanized equipment which has been devised locally and done very well is not being disseminated and spread within the sector.

For example, an electrical device for cleaning used oil which was built in the experimental shop of the Kazakh Civil Aviation Administration produces a substantial economic impact. Nonetheless, no one is working on the problems of manufacturing it in series.

In some cases experimental shops of territorial administrations are developing new mechanized equipment in a more operational manner than the experimental civil aviation plants built specially for this purpose. For example, the same Kazakh administration has made 26 devices to remove ice from aircraft using M-701 aircraft engines, while Experimental Civil Aviation Plant No 85 is only now preparing to produce its first batch of five such machines, which were developed jointly with the State Scientific Research Institute of Civil Aviation. It is hard to see any sense in this.

There are also shortcomings in the use of mechanized equipment and its servicing. For example, very expensive airport air conditioning units are hardly used at all at aviation enterprises (VOZDUSHNYY TRANSPORT has written about this numerous times).

The reasons for this situation lie chiefly in the organization of things. We all know how carefully any airport prepares to begin using new types of airplanes. But no particular effort is observed in the local areas before the introduction of new and sometimes complex ground equipment. Service personnel are not trained and questions of labor payment are not resolved. The results of such omissions are that the equipment stands idle, becomes obsolete, and ultimately is unusable. It is relevant to say a few more words here about the above-mentioned air conditioners. We know that if they are used instead of auxiliary power units fuel consumption is cut about 10 times while also preserving the service life of the aircraft installation. So broad use of the airport air conditioners which are available at airports could produce savings of hundreds of thousands of rubles and dozens of tons of aviation fuel.

Another matter that cannot be ignored is the intolerably long periods of time required to build new mechanized equipment. As a rule development takes from three to five years, and there are cases where development has dragged on for up to 10 years. For example, development of the much-needed MOS-2 machine to clean up the cabins of planes was begun by the Ministry of Construction, Road, and

Municipal Machine Building in 1973, but no one yet can say when series production will begin. During this time an entire generation of aviation equipment has come and gone, and the specifications presented for the machine in 1973 are not appropriate to current aircraft.

What steps can we see here? Above all the activity of scientific organizations in the sector working on the development of mechanized equipment should be stepped up. As the November 1982 Plenum of the CPSU Central Committee observed, "Reserves must be sought in stepping up scientific-technical progress and broad, rapid introduction of the achievements of science, technology, and progressive experience in production." We understand this to mean that the employees of our institutes should study and know the needs of the sector more thoroughly, establish close contacts with production, and resolve all problems related to mechanization of technical servicing processes operationally.

It also appears advisable to review the question of concentrating research and design work on development of mechanized equipment at one organization, assigning it production facilities to manufacture and test experimental models. This would allow a significant reduction in the development time of mechanized equipment and permit improved quality. Furthermore, such a subdivision could move on to developing entire sets of equipment to service particular classes of aircraft, including the aircraft of PANKh's.

The timeliness of establishing such a subdivision within the framework of the scientific and production organizations existing in the sector is also confirmed by the necessity of coordinating the activity of the constantly developing system of experimental bases of territorial administrations and giving them practical help in making up documents for and deciding questions of series production of small mechanized equipment.

Another of our primary tasks is to develop stationary systems to supply aircraft equipment with all types of energy and essential gases and liquids. Their introduction would make it possible to reduce expenditures for servicing, release a large number of drivers and special vehicles, and cut down the number of vehicles on the platform in the immediate vicinity of the aircraft.

Another critical problem is more narrowly specializing the experimental civil aviation plants in manufacturing mechanized equipment. Violation of this principle leads to losses of time and lower quality in the machinery being produced. An example of this was transferring the manufacture of the standardized UPV-1 air heater from plant No 85 to plant No 409 of civil aviation, which resulted in the loss of about three years.

I believe that carrying out the above-expressed proposals would allow us to focus the efforts of all the specialists of the sector who are working to raise the level of mechanization of the processes of technical servicing for aircraft.

## Designer Responds, Offers Solutions

Moscow VOZDUSHNYY TRANSPORT in Russian 18 Dec 82 p 3

[Article by I. Sumets, chief designer, Experimental Civil Aviation Plant No 409, Dnepropetrovsk, under the rubric "Combining the Efforts of Science and Production": "Introduce New Equipment More Aggressively"]

[Text] On 14 December 1982 VOZDUSHNYY TRANSPORT published an article by A. Nikitin, deputy chief of GUERAT [possibly Main Administration for Operation and Repair of Aviation Equipment], under the title "Raise the Level of Mechanization." In the article the author raised timely questions of mechanizing labor-intensive processes in servicing aircraft equipment, eliminating manual labor, and concentrating research and design work in this area.

The problems raised in the article drew a response from our leaders. Today we publish one of the letters.

I read A. Nikitin's letter and immediately took up my pen to share my own observations and thoughts. Naturally, I will talk about things that I know well, what disturbs me as a person working at an experimental civil aviation plant.

In my opinion the present system of developing and manufacturing experimental models and new equipment has a number of shortcomings. Scientific and creative personnel in the sector who are working on mechanized ground equipment are dispersed. Judge for yourself: our plant must work together with three institutes, not counting their branches. The institutes sometimes duplicate one another's work. It comes out that instead of a comprehensive solution to the problems of mechanizing and automating production processes the questions posed are very specific. And why hide it? Sometimes they are only relevant to the preparation and defense of dissertations.

That is how the development of new technology is at the Aviaremont [Aviation Repair] Association today; it is a much less important matter than repairing planes and helicopters. Experimental plants are not always interested in the development and introduction of new mechanized equipment; they need to install and incorporate equipment and revise technological processes. And the plan for production of series-produced output must be "stretched out." For these reasons the times for development of various articles are artificially dragged on for many years. As the November 1982 Plenum of the CPSU Central Committee observed: "People are called to account for failure to meet the production plan, but at most they are mildly reprimanded for poor introduction of new equipment." And certainly this has an effect on the quality of development and manufacture of new articles. For example, it will not be permitted for a design to include parts and assemblies which the plant cannot manufacture today. And this also applies to materials.

In short, considering that the experimental sector is 70-85 percent engaged in series production, making new articles is becoming a secondary matter. There is practically no time for polishing them and for acceptance testing; they are sent



to series production in almost "raw" form. As a result, our mechanized equipment is often inferior to the best domestic and foreign models.

Many articles need modernization and improvement of design and operating features within a short time after reaching series production. Our institutes are not working on these matters. Their work practically ends in the stage of acceptance testing. And modernization at the plant basically involves changing the design to reduce the cost, even if this means worsening features. The fact that the chief designer's department is subordinate to production also leads to a worsening of features. The lack of any material or assembly component, the slightest danger of not meeting the plan, leads to a design change, even without our consent.

Here is something else that must be mentioned. Because the plant is an experimental one and has a high percentage of engineering-technical personnel, overhead expenditures for the output produced are very high. Therefore, the cost of the output is much higher than at the enterprises of other ministries. When the economic efficiency of development and introduction of new equipment is calculated, it often proves negative and this prevents beginning the production of many articles.

That, briefly, is the situation at our experimental plants today. But as they say, criticism is good when it is followed by constructive suggestions. And I certainly will try to offer such suggestions, though of course without claiming that they are absolutely unconditional (there may be other opinions, and possibly better arguments).

I think that the time has come to set up a scientific subdivision for development of the full assortment of mechanized and automated ground equipment. This could perhaps be done at the State Scientific Research Institute of Civil Aviation or another institute. In other words, all work on mechanization should be concentrated in one place. It would appear wise to remove the design departments and experimental sectors from the experimental plants and transfer them to this institute with the status of branches. This scientific subdivision with the design departments and experimental sections would develop and make new models, conduct operations testing, and prepare the technical documents. During series production of the new equipment it would carry on author's supervision of the quality of manufacture and review the need for modernization of the product.

As we see, this kind of reorganization could be carried out without enlisting additional personnel. All that would need to be left at the plants would be design-production process departments to set up production and incorporate series-produced output.

Such a solution to the question (in my opinion, I repeat) would make it possible to concentrate scientific research, design, development, and manufacture of new equipment in one place. This would insure comprehensive solutions to the critical problems of ground servicing of aviation equipment. This would help the sector respond optimally to the complex and important challenges posed at the November 1982 Plenum of the CPSU Central Committee.

From the Editors

As we see, the author does not claim that his proposals are beyond dispute. He rather offers reflections and advice. That is the way it should be. After all, the problem of raising the level of mechanization in the sector cannot be solved in one sweep. It requires a serious approach, thorough analysis, and at the same time determination and flexibility.

We would like to hear opinions on this problem from GlavNTU [possibly Main Scientific Technical Administration], the State Scientific Research Institute of Civil Aviation, and the Aviaremont All-Union Association, as well as our readers.

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## BRIEFS

**MINSK AIRCRAFT REPAIR**—Airplanes from airline companies in Hungary, East Germany, Czechoslovakia, Yugoslavia, and other countries receive a "second life" at the Minsk Aviation Repair Plant of Civil Aviation, one of the leading enterprises in the Belorussian capital. The plant collective has adopted stepped-up socialist obligations and is fulfilling them. Since the start of the year they have already done 115,000 rubles worth of repair work beyond the plan. [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 7 Nov 82 p 3] 11176

**TECHNICAL INNOVATIONS**—Petrozavodsk—Efficiency workers at the Petrozavodsk Aviation Enterprise are among the leaders in the Leningrad Administration. Each year they develop and introduce dozens of technical innovations that have a significant economic impact. The innovators have developed and introduced about 40 efficiency proposals this year again. Radio engineer V. Bakharev developed and applied a particularly valuable technical innovation. It is used to transmit a precision time pulse in the ground flight support services. The device was displayed at the Exhibition of the Achievements of the USSR National Economy and received a high evaluation. The aviation enterprise recently received good news from Moscow: V. Bakharev has been awarded the bronze medal of the Exhibition of the Achievements of the USSR National Economy. [By N. Finogenov] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 23 Nov 82 p 3] 11176

**HIGHJACK TO TURKEY**—On 7 November 1982 three armed air pirates on a Soviet An-24 passenger plane flying from Krasnodar to Novorossiysk and Odessa made an attack on the crew and forced them to land the plane in the Turkish city of Sinop. During this one of the crew members and one passenger were wounded by the hijackers. The next day, 8 November, the aircraft with its crew and passengers returned to the homeland. The Soviet Government has called on the Government of Turkey to immediately turn over the criminals who hijacked the aircraft. [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 13 Nov 82 p 4] 11176

**IL-86 DELIVERED TO TASHKENT**—Tashkent, 22 December —A 350-seat Il-86 passenger liner arrived today to be based here. The collective of the Uzbek Civil Aviation Administration, a winner in the all-Union socialist competition in honor of the 60th anniversary of the USSR, is the first territorial subdivision of Aeroflot to receive this aircraft for permanent use. Until now the Il-86 has been based only in Moscow, from which it flew to Tashkent, Minvody, Simferopol, Novosibirsk, and certain foreign cities. "Moscow aviators helped us incorporate the IL-86," said G. Rafikov, chief of the Uzbek Civil Aviation Administration. "Uzbek crews,



dozens of flight attendants, and about 100 ground service specialists went through training and job practice in the capital. After all, before the end of the five-year plan we must be able to service and operate several more wide-body planes." Now the pilots of Moscow and Tashkent will work together on one of the country's busiest air routes. This will provide additional convenience to passengers and save a great deal of fuel. [By Yu. Kruzhilin] [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 23 Dec 82 p 3] 11176

NEW IL-86 ROUTE—Beginning on 5 January 1983 the IL-86 airbus, the flagship of civil aviation, will fly from Moscow to Rostov-na-Donu. The plane will take off each day at 1310 from Vnukovo Airport. It is flight No 1175. Flying time will be 2 hours and 5 minutes. [Text] [Moscow VOZDUSHNYY TRANSPORT in Russian 30 Dec 82 p 4] 11176

CSO: 1829/91

## MOTOR VEHICLE

### PRODUCTION PLANS FOR MINSTROYDORMASH

Moscow STROITEL'NYYE I DOROZHNIYYE MASHINY in Russian No 10, Oct 82 pp 1-4

[Article by A. A. Tkachenko, head of Soyuzstroymashavtomatizatsiya All-Union Industrial Association: "Tasks Connected with Increasing Production Efficiency by Retooling Existing Minstroydormash enterprises from 1981-1985, Implement Decisions of the 26th Congress of the CPSU!"]

[Text] Utilize production capacities more efficiently; make more extensive use of high-efficiency technology and improve the structure of existing capital assets and replace them on a timely basis.

(Guidelines for the Economic and Social Development of the USSR for the Years 1981-1985 and the Period Extending to 1990)

The years from 1976 to 1980 saw 396.7 million rubles (43.9 per cent of total capital investment) spent toward the retooling of Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] enterprises.

Capital investment was channeled primarily toward:

- increasing production output (output rose 474.8 million rubles);
- increasing labor productivity (labor productivity rose 14.5 per cent as a result of retooling; more than 39,000 workers were conditionally freed while production labor input dropped 32.4 million norm-hours);
- the mechanization and automation of production processes (11,700 workers were shifted from manual to mechanized labor; the proportion of manual labor performed dropped from 33.8 per cent in 1975 to 29.5 per cent in 1980, while the degree of mechanization of labor rose during this period from 55.3 per cent to 59.6 per cent);
- cutting production costs (production costs reduced 103 million rubles) and
- improving the quality of manufactured machinery (proportion of ministry production in the highest quality category rose from 11.06 per cent in 1976 to 27.7 per cent in 1980).

In the course of the Tenth Five-Year Plan period some 28 million rubles were spent on reequipment for preliminary production operations.

Work done in 30 casting and 36 forging shops made it possible to increase casting production capacity some 29,400 tons, forged stock production capacity by 28,000 tons, and to improve health and safety conditions for workers in 18 hot shops.

The Tenth Five-Year Plan period saw the full mechanization of 1027 shops and sections and the introduction of 579 mechanized, automatic and semiautomatic production lines and more than 3300 units of special-purpose and gang machines, automatic, semiautomatic and other high-efficiency equipment, including 301 machines with numerical programmed control.

Expenditures also included 97.6 million rubles for the acquisition of equipment to replace worn-out machinery and maintain existing capacities.

The conversion of a number of plants over to the manufacture of new machines with hydraulic drive and the introduction of new product types with improved characteristics made it necessary to respecialize the production operations of a number of plants.

As a result of the respecialization of productive capacities as well as the expansion of those capacities through retooling, the Tenth Five-Year Plan period saw branch plant production grow by 2589 million rubles. At the same time, capacities fell by 1990 million rubles in consequence of respecialization involving the removal of obsolete machines and equipment from production.

Resources allocated for retooling during the Tenth Five-Year Plan period made it possible to acquire computers for a total of 13.7 million rubles.

Substantial progress was made in efforts to improve loading, unloading, transport and warehousing operations. With the introduction of 478 mechanized warehouses alone, for example, the proportion of these facilities rose from 63.1 per cent of the total in 1975 to 69.4 per cent in 1980; at the same time, we improved the structure of our lifting and transport equipment inventory.

Enterprises of VPO Soyuzstroy mashavtomatizatsiya [All-Union Production Mechanization and Automation Industrial Association] manufactured and delivered to ministry plants equipment for mechanizing lifting, transport and warehousing operations worth some 60 million rubles and fabricated production equipment worth a total of 131 million rubles.

Particular experience has been gained in reequipping our enterprises. More specifically, plans for reequipment constitute one of the levers by which through technology we can affect production.

Developers (engineering institutes), manufacturers of production equipment (plants) and assembly, installation, repair and adjustment organizations have been combined in a single all-Union industrial association—Soyuzstroy mashavtomatizatsiya.

Technological improvement constitutes an integral aspect of equipment manufacture, to include the fabrication of special-purpose production and mechanization equipment, as well as of the necessary assembly, installation and adjustment operations.

The reequipment process today consists essentially in channeling capital expenditures toward optimization of the structure of the basic production equipment inventory by

saturating it with the latest high-precision machines as well as by providing the industry to the greatest extent possible with special-purpose production equipment, mechanization and automation systems and automatic manipulators so as to the maximum extent possible free workers from having to perform monotonous, inefficient operations, create the possibility of multimachine positions and on this basis to achieve maximum labor productivity and metal waste reduction.

Of greatest importance have been the fundamentally new requirements for raising the technical level of our production, the most critical of which is the demand that it involve minimum expenditures of labor, material, fuel and energy resources.

There have been substantially greater requirements, and, accordingly, increased capital expenditures for protecting the environment and improving working conditions.

New intensified and accelerated plan targets for raising the technical level of production operations have necessitated a different approach, additional measures, a reevaluation of our manpower and a corresponding reorganization of operational procedures.

An integrated-target method of planning technical development constitutes the basis of the branch program for retooling existing branch enterprises over the period 1981-1985, a program which has been put together for the first time.

This program calls for the combination of all manpower and resources for accelerated, target-oriented efforts to raise the technical level of production operations and the concentration of attention and efforts on the branch's most important problem areas.

Progress in implementation of this program is monitored by the All-Union Production Mechanization and Automation Industrial Association through all-Union and other industrial associations by means of an automated control system; each quarter the ministry collegium reviews progress achieved in reaching program targets and approves measures designed to accelerate the reequipment of existing production facilities.

The most important problems dealt with by the branch's integrated-target reequipment program and the directions to be taken in solving them are as follows:

1. Increasing total Eleventh Five-Year Plan production by increasing labor productivity (figures for 1981 and the first quarter of 1982 show that this is possible and achievable).

Plans call for this problem to be solved by optimizing the structure of our machine inventory and by increasing the proportion of advanced equipment, most importantly the proportion of forging and pressing equipment from 15 to 18.8 per cent and of automatic, semiautomatic and robotized equipment and metal-cutting equipment with numerical programmed control from 12 to 19 per cent, to include a 27 to 34 per cent increase in the proportion of these machines employed in basic production.

A ministry order has approved a new procedure for ordering and replacing production equipment with the objective of concentrating capital investment on optimization of machine inventory; work is also under way on development of a branch automated control system (application ASU).

The program calls as well for improvement in the state of machine production equipment by substantially increasing capacities and volumes of in-house production-equipment manufacture.

Planned rates of growth in the volume of special tool and production-equipment manufacture by more than 2 times exceed the growth rates of the production plan.

Also approved has been a separate subprogram, a integral component of the reequipment program, which provides for increased capacities and greater output of manufacturing equipment at central plants of industrial associations as well as the respecialization of two plants for equipment fabrications with the objective of increasing the annual volume of production equipment manufacture to 58 million rubles by 1985 as compared with 35 million rubles' worth in 1980.

Plans also call for a reduction in the percentage of workers assigned to low-efficiency manual labor from 29.6 per cent in 1980 to 23.7 per cent through implementation of the "Reduction of Branch Manual Labor" subprogram on the basis of the introduction of mechanization, automation and robotics equipment in secondary, to include loading and unloading operations, thereby freeing more than 12,000 workers from manual labor over the course of the Eleventh Five-Year-Plan period.

Plans call in this connection for the introduction of more than 600 automatic manipulators (robots), primarily for operations creating harmful working conditions (welding, painting, electroplating etc.).

Success in these efforts is to reduce the production labor input 18.3 per cent and free up some 43,000 workers.

2. Reducing the metal waste associated with machine fabrication over the course of the Eleventh Five-Year-Plan period by more than 200,000 tons, to include waste going to chips by 100,000 tons, and increasing the rolled metal utilization factor from 0.766 to 0.79 in 1985 with the objective of achieving a 30 per cent increase in machine output by 1985 using the same amount of metal the program required in 1980.

Because of its urgency and importance, this problem has been removed from the framework of the reequipment program and attacked by provisions of the separate "Saving Raw Material and Fuel and Energy Resources" program.

At the level of production the problem of cutting down on the amount of metal going to waste in the machine fabrication process reduces to that of approximating a billet with respect to weight and geometry as nearly as possible to the finished piece, that is, to the problem of making billet production more efficient.

In casting—the task here is to create capacities and increase production of castings using advanced methods: chill mold casting (115 per cent); pressure-die casting (130 per cent); investment and burn-out casting 4 times; shell-mold casting (120 per cent); using air-hardening and cold-hardening mixtures (120 per cent) and introducing new technologies into industrial-scale operation: vacuum-film molding, burn-out molding in magnetic molds, low-pressure casting etc.

In forging—to create capacities and substantially increase production of precision hot forgings and pieces produced by plastic deformation of metal in a cold or semihot state, cold heading as well as by rolling, that is, to introduce piece-making mills with the objective of replacing the traditional "chip" technology with low-waste and waste-free production processes and equipment. Plans call for production of this type of billet to grow to 47,000 tons by 1985 against the 10,000 tons produced in 1980.



In producing billets from sheets and bars — that is, reduction of the reduction of waste in the sheet layout and cutting process by using roll steel and computers to develop optimum layout patterns, making billets by the edge bending method instead of cutting them out of a sheet, fuller utilization of production wastes, etc.

In the case of the production of billets by sintering metal powders, it is proposed to create branch capacities (1000 tons) and organize piece production (small-scale) with an three-fold increase in the use of sintered components in machines as compared with the 1980 level.

In addition to solving urgent problems connected with the improvement of billet precision, plans call as well for steps to be taken to reequip casting and forging shops, which constitutes the most difficult phase of the machine-building process. It is proposed to channel 50 million rubles in capital investment into reequipping 30 foundry and 7 forging shops with the objective of increasing production of cast billets and forgings 35,000 and 34,000 tons respectively and of preserving the 200,000-ton capacity of foundry shops to be closed.

3. Organizing capacities for centralized fabrication of special-purpose production, to include the following: hydraulic equipment, connecting devices and other standardized components, tractor caterpillar-track assemblies, high-torque reduction gears and production and other equipment and doing this by respecializing existing capacities to the tune of 173.5 million rubles. Plans also call for reequipment to increase production capacities some 326.5 million rubles and capital investment to preserve and maintain existing capacities in the amount of 315 million rubles, which is dictated by the need to fulfill Minsstroydormash plan production-volume commitments for 1981-1985.

4. Among the serious problems requiring solution during the Eleventh Five-Year Plan period are those of increasing the efficiency of the work of our technological planning institutes, laying solid foundations for further advances in science and technology and accelerating the pace at which the fruits of institute research are introduced into actual production operations.

A program has also been outlined to attack these problems, a program which on the basis of institutional specialization calls for developer efforts to be concentrated upon basic production processes (problems), eliminating duplication and enhancing the impact these efforts have on rises in the technical level of production.

This year, 1982, has seen the introduction of plan indicators to reflect institute and design office performance efficiency in the following categories: volume of research and development work, level of first-year introduction of the products of research and development, targets for waste reduction, electric power savings, reductions in labor input etc.

With the objective of raising the technical level of project-planning studies, a new procedure for planning and approving projects has been established which involved the following:

- expert evaluation of technical proposals as well as of the project as a whole;
- approval in the project development stage of a specific program of introduction indicating the plants which be fabricating special-purpose production equipment and devices, other participants in the process of introducing the results and the cost of this work;

establishment of more precisely defined contractual relationships between developer and customer specifying the extent to which each is responsible for the development and introduction of the results of research and development.

Accelerating to the maximum extent possible the pace at which the results of scientific research and development efforts are introduced into industrial production operations, with a maximum of 2 years allowed between the development stage and the introduction stage, has been set as a task.

Plans call for the creation of a single technological planning system with the objective of developing plans for new construction and the expansion, modernization and reequipping of existing enterprises at the highest possible technical level.

A schedule for the completion of plant reequipping plans with reference to branch problem areas goes into effect in 1982.

5. The logical culmination of efforts to accelerate introduction of advances in science and technology into actual production operations is an improved organization of production and labor. Plans in this direction call for more extensive introduction of brigade forms of labor organization with pay computed on the basis of end result, multimachine work positions, job combination etc.

It is anticipated that some 50 per cent of all resources allocated to the ministry for the Eleventh Five-Year Plan period will be channeled into the effort to implement this integrated target-oriented program to reequip branch enterprises.

Plans call for implementation of the reequipping program:

- to achieve an increase in labor productivity of 19 per cent;
- to generate savings from reduced production costs totaling 165 million rubles;
- to conditionally free up 43,000 workers;
- to reduce production labor input by 53 million norm-hours;
- to result in the shifting of 12,300 workers from manual to mechanized labor;
- to bring the proportion of manual labor to 23.7 per cent  
and the proportion of mechanized labor to 65.2 per cent;
- to increase the coefficient of metal utilization to 0.79;
- to save 153,000 tons of rolled ferrous metal products;
- to achieve increases in production capacities totaling 326.5 million rubles;
- to specialize existing capacities to the extent of 173.5 million rubles;
- to preserve and maintain existing capacities to the extent of 315.3 million rubles;
- to create 371 fully mechanized shops and sections;
- to create 295 semiautomatic and automatic mechanized lines;
- to introduce (in place of general-purpose machines) 3395 special-purpose gang, automatic and semiautomatic machines,
- to include 1270 fabricated in-house and
- to introduce 600 automatic manipulators.

Final results of the accomplishment of tasks associated with the branch's integrated target reequipping program for 1981 (tasks for the most part accomplished) are evidence that the basic problems requiring solution over the course of the Eleventh Five-Year Plan period and the directions taken toward realization of these solutions have been properly chosen.

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## RAILROAD

### 'PRAVDA' CITES PROBLEMS, CALLS FOR GREATER EFFORTS IN RAILROAD TRANSPORT

Moscow PRAVDA in Russian 3 Jan 83 p 1

[Editorial: "The Steel Arteries"]

[Text] Railroad transportation plays a special role in our country's national economic complex. Like the blood circulatory system, it links together all the elements of the economy, all the regions where many different products are produced every day. To deliver these products to customers on time and without losses is a major nationwide challenge.

Leading collectives of railroad workers are achieving good results. The locomotive brigade of Hero of Socialist Labor S. Ye. Yatskov, an engineer from the Depot imeni Il'ich of the Moscow Mainline, for example, fulfilled its plan assignment for last year by 7 November. But the sector as a whole is working under great strain. At the November 1982 Plenum of the CPSU Central Committee Comrade Yu. B. Andropov observed, "The Politburo is disturbed by the situation in transportation. The Ministry of Railroads continues to fail to meet the economy's need for shipment of fuel, timber, and other freight."

The Plenum of the CPSU Central Committee and the session of the USSR Supreme Soviet devoted considerable attention to further development and improvement of transportation work. The CPSU Central Committee and USSR Council of Ministers adopted the decree entitled "Improving the Planning and Organization of Transportation of National Economic Cargo and Passengers and Strengthening the Influence of the Economic Mechanism on Raising the Work Efficiency of Transportation Enterprises and Organizations." Steps were outlined to standardize indicators and economic norms for most types of transportation. Incentive for transportation workers will be provided not for number of ton-kilometers, but for improving the quality of their work, above all for fulfilling the plan of freight shipping in tons at the right time and for the established assortment.

This will require more accurate, comprehensive planning of shipping on a national scale, establishing rational economic ties, and delivering output with due regard for minimal transportation costs. Planning and supply agencies, ministries, and departments must wage a resolute joint campaign against counter shipment of similar freight. Formulating optimal routes will make it possible, without additional expenditures, to free hundreds of thousands of cars, conserve



a significant quantity of fuel and energy resources, and substantially reduce transportation costs.

In the new year railroad workers face a clearly defined task: rhythmic, uninterrupted delivery of all national economic freight to its destination. To accomplish this it will be necessary to put all production reserves into operation, to make fuller use of the fixed capital and equipment of the railroads, and determinedly strengthen discipline in all elements. A certain psychological reorientation is also needed. A number of railroads have tolerated poor work and gotten used to justifying their failures, with a clear conscience, by blaming lack of resources. This discourages people and leads to situations where even formerly outstanding collectives begin to slide. For example, the well-known Grebenka Depot of the Southern Railroad is now turning out significantly fewer repaired locomotives than in past years although they have the same resources and production capacities.

Transportation must step up the introduction of scientific-technical advances and refine norms which are still by no means always progressive. Here is just one example. When the Ministry of Railroads began working out the new three-year schedule they expected that it would be more rational than the current one. But upon analyzing the proposals of the railroads it was found that not all of them had fully taken account of the growing volume of shipping and assignments of the five-year plan. For example, the October Railroad envisioned norms for route speed that were 4.3 kilometers an hour lower than the current speed.

Such cases must be sternly examined both at the Ministry of Railroads and in local party and Soviet bodies. Transportation workers must always remember that the rhythmic work of hundreds and thousands of labor collectives in industry, construction, agriculture, and all our economy depends on their work. The schedule should be the technological foundation of all shipping work. Fulfillment of the schedule is the law and a reliable foundation for supporting the shipping plan.

Some railroad executives continue to follow the old procedure of classifying freight as important and not very important, mistakenly thinking that if they fulfill the assignment for shipment of coal or some other such freight, they can use this to justify failure to fulfill the plan for cement, equipment, and so on. This is an unacceptable misconception. The proper policy is to deliver all freight on time to every customer.

The principal reserves are steadily raising the level of organization of operations work, using all existing means of transportation more efficiently, and adopting the practices of leading collectives more quickly. Specifically, the initiative of the collectives of Moscow railroad workers and enterprises in industry and construction, who obligated themselves to insure that all cars and containers dispatched are in good condition, should be disseminated more broadly. This initiative has been endorsed by the CPSU Central Committee.

The state is appropriating a great deal of money, 28.9 billion rubles, for the development of transportation and communication. In 1983 1,100 kilometers of new railroads and second tracks will go into operation and the sector will

receive tens of thousands of freight cars, a large number of locomotives, and a great deal of other equipment. The paramount task of railroad workers is to use these resources in a wise, productive, and frugal manner.

Communists and all working people of the sector, whether they are specialists responsible for the situation on an entire road, duty dispatchers, engineers, or repair mechanics, are expected to campaign vigorously at their work places for shipping efficiency and quality, accelerating car turnaround, and increasing the weight and speed of trains. These and other pressing issues related to carrying out the program to improve railroad work should be a subject of constant attention for party committees, trade unions, and every labor collective.

Raising the working efficiency of railroad transportation is an important factor in further national economic growth and successful fulfillment of the decisions of the 26th CPSU Congress.

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## RAILROAD

### BAM CONSTRUCTION PROGRESS REPORT

Moscow GUDOK in Russian 26 Dec 82 p 2

[Article by R. Minasov: "Awaiting the Golden Spike"]

[Text] Four track-laying cranes, two each on the west and eastern sections of the BAM, now in the 9th year, overcoming innumerable obstacles, are persistently moving toward each other, leaving steel track behind them.

The competition is continuing under the slogan "Who will open the BAM?" for connecting the two halves of the two symbolic switches of the new construction projects. The heat of the competition is increasing as the day for completion of construction approaches, bringing into its orbit ever newer BAM detachments. All the Young Komsomol collectives of the construction project are now participating in it.

The halves of the first switch will possibly be connected next year on the eastern section. The little-known point of Tungal, which is located 507 kilometers from Tynda, has been selected as the point of meeting of those traveling from Zeysk eastward and from Fevral'sk westward.

But the Chita section of the BAM, stretching 330 kilometers, will become the finish line, with which laying of track on the entire route will be completed. The builders have pledged to lay the last "gold" joining section no later than 29 October 1984--the birth date of the Lenin Komsomol--near the Kodarskiy tunnel.

Where are the track layers today? They can be seen on the western section at Khani and 20 kilometers from Muyakan and on the eastern section they can be seen at Zeysk and Gorsikon. In total complexity the four track layers have to cover a little more than 600 kilometers. But these kilometers are unfortunately the most difficult on the entire route. And the builders do not have very much time--less than 2 years.

At the beginning of this year on a cold January morning, a column of 100 powerful vehicles left Severomuysk for the Kodarskiy ridge, through which the last BAM tunnel must be driven.

They were hurrying because they were supposed to drive no less than 150 meters of the underground corridor this year. The Kodarskiy tunnel itself, compared to other relatively smaller tunnels, is 2 kilometers. But it is being driven in unstable rock. The tunnel specialists were full of desire not only to fulfill but to overfulfill the annual task.

And it is not their fault that this did not happen. The construction materials and mining equipment are delivered to the Kodarskiy tunnel from the Buryat section along a temporary highway next to the route. And it leaves much to be desired here, I can attest. Especially on the Kodar-Kuanda segment.

The first interruption occurred at the beginning of the year in construction of the unique 15-kilometer Severomuysk tunnel. The well-known brigades of Hero of Socialist Labor V. Tolstoukhov and V. Bezridnyy met under the thick earth. Since then they have been waging a persistent battle with the mountain for the entire year. Coping with a complex situation, the tunnel drivers have begun to establish records. They decided to fulfill all norms at the western entrance in December in honor of the 60th anniversary of the founding of the USSR.

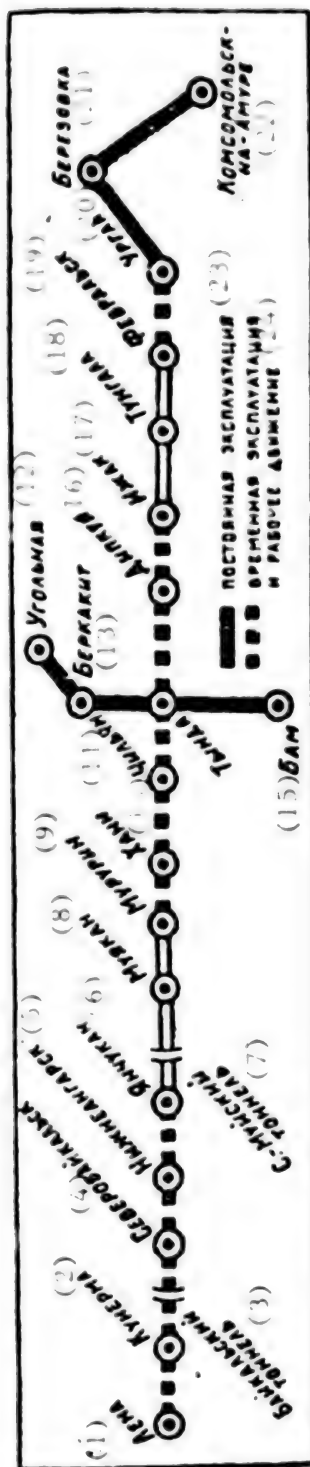
The builders in the Baykal tunnel completed concreting the walls and roofs and are completing installation of equipment. The second, longest cape tunnel on the northern bank of Lake Baykal was driven in honor of the 65th anniversary of the Great October Socialist Revolution.

Rails arrived as early as 13 May to the banks of the rushing taiga river Khani, where regions of the Yakutsk ASSR and Amur and Chita Oblasts come together. And immediately the Young Komsomol brigade of Ivan Varshavskiy became involved in development of the station. It was completed and proceeded further. It is now at the approaches to Mururin.

The Buryat section of the BAM begins on the left bank of the Vitim River. A track layer proceeding east is working here near Muyakan. It is led by the Young Komsomol brigade of Aleksandr Bondar'. It has been competing for 6 years with the brigade of I. Varshavskiy. The goal of the labor competition is to join up near the Kodarskiy tunnel on 29 October 1984. Bondar's brigade has extended its section of the mainline by 127 kilometers during the past year. Rails were expected at Muyakan by the 60th anniversary of the founding of the USSR, but this did not happen. Non-rhythmic delivery of materials for the track superstructure, especially of cross-ties, frequently delayed the laying.

Let us look toward the east. The rail troops celebrated the 37th anniversary of the great victory day with an important labor achievement. Having overcome enormous difficulties, they managed to bring the steel line to the Zeysk reservoir and later, having passed the track layer over the longest bridge on the BAM, laid track to Zeysk station and proceeded further. The rail troops plan to celebrate the new year at Gorsikon.

The builders of the eastern section noted the 65th anniversary of the Great October Socialist Revolution with yet another important achievement: the 303-kilometer Urgal-Postyshevo section was turned over for permanent operation almost 2 months ahead of schedule.



Key:

1. Lena River
2. Kucherna
3. Baykal Tunnel
4. Severobaykalsk
5. Nizhneangarsk
6. Yanchukan
7. Severo-Muyak Tunnel
8. Muyakan
9. Mururin
10. Khan
11. Chilchi
12. Ugolnaya

13. Berkakit
14. Tynda
15. BAM
16. Dipkun
17. Izhak
18. Tungala
19. Fevral'sk
20. Urgal
21. Berezovka
22. Komsomolsk-na-Amure
23. Permanent operation
24. Temporary operation and work traffic

As you can see, all the BAM workers have done a lot during the past year. The Nizhneingarsktransstroy, Nizhneingarskstroy and Nizhneingarskstroy trusts, Kamennokopansk Administration and other organizations have coped with the annual tasks ahead of schedule. However, unfortunately, there are interruptions. Thus it happened, let us say, with laying of the 26-kilometer detour at the Severomuysk tunnel. A lag also occurred, as we indicated, on the western section, where the rails were supposed to reach Moyun.

In my first report, despite the agreements concluded between the executors and the suppliers on cooperation on the "workers' relay race" principle, the suppliers continued to place spokes in the wheels. Life indicates that this situation occurs most frequently where the level of labor and production discipline is low and references to "objective" difficulties have become usual. Thus, the noble, patriotic beginnings are being discredited and the agreement on cooperation is being transformed to a piece of paper that does not obligate anyone.

The coming year will be crucial and important for the multithousand collective of the Bureya-Amur Mainline Railway and construction has entered a decisive phase when the second Transsib [Trans-Siberian Railroad] should accept trains over its entire length. A total of 14 million cubic meters of soil must be moved and 108 kilometers of track must be laid on the western section, the same quantity of soil must be moved and 137 kilometers of rail must be laid, 100 drain pipes must be installed, 80 large and small bridges must be constructed, 4,540 meters of main tunnels must be driven and 3,000 meters of drain transport shafts must be driven on the central section. It is planned to turn over 2,000 square meters of housing at Tynda and a total of 55,000 meters throughout the BAM, four secondary schools, five practitioner-midwife stations and a hospital complex at Severobaykalsk. The rails on the western section should arrive from the third siding of the Severomuysk detour to Iksimo station and those from Olondo station to Sakukan should arrive on the central section.

The country is generously financing the great construction project. It is sufficient to say that the expenditures for the social and service program of the new economic region of Siberia exceed the total appropriations for laying the entire railroad. And still one cannot say that good living conditions on the BAM have been provided for everyone. Some managers, in the pursuit of high production indices, forget about the everyday life of people, their spare time and living conditions. And they frequently do not fully utilize the funds allocated by the state for construction of housing and cultural and service facilities.

There are excellent new villages on the BAM, for example, Kichera, Alonka, Irgal and Ulkan, but there are still few of them, and for the time being small, undeveloped populated points predominate. In short, much still remains to be done so that the people feel that they are real hosts here rather than temporary residents.

And still, when one visits the BAM, among the entire range of feelings that encompass one, you especially distinguish the feeling of envy toward people

who perhaps, not recognizing it themselves, do heroic labor and complete a campaign every day. Siberia and the Far East are being restored through their labor and hands.

Construction of the BAM is continuing, while the young 32-year-old railroad is already returning the funds expended by the state on its construction. Echelons with coal, timber and now with ore are travelling toward the east and west.

It is especially important to emphasize on the 60th anniversary of the USSR that the entire country is building the BAM. More than 5,000 collectives of industrial enterprises and planning and scientific research institutes are now working under the slogan "Fulfill orders for the BAM ahead of schedule." Representatives of all the union republics, many krais, oblasts and cities of the Russian Federation are laboring on the mainline itself. One can find representatives of 70 nations and nationalities in the detachments of the Chita section alone.

The brigades of BAM builders are now driving through the Siberian taiga toward each other to deliver as rapidly as possible the natural resources of the vast territory to the service of the national economy--for this very purpose.

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## RAILROAD

### JAPANESE BUSINESSMAN ON TRADE WITH SOVIET UNION IN BAM REGION

Moscow GUDOK in Russian 5 Dec 82 p 3

[Article by Yevgeniy Bugayenko, special APN correspondent: "BAM is Opening New Prospects for Us"]

[Text] "The Soviet Union is our partner. We became convinced of this during our work with the foreign trade organizations of Moscow, Khabarovsk and Nakhodka," said the president of the Japanese Progress Trading Company Kimoto Teruaki in a conversation with an APN correspondent in Khabarovsk. "Our success shows that you have selected the proper course, having begun trade with the Soviet Union on a mutually advantageous basis 35 years ago on the principles of friendship and honesty. The company's turnover of merchandise has reached 420 million dollars.

"A large section of the Baykal-Amur Mainline Railroad, passing through the regions of Khabarovskiy Kray, abundant in natural resources, began permanent operation in November. We see in this primarily favorable prospects for development of mutually beneficial trade. We were interested in the most rapid development of the abundant resources of this region to obtain the goods from there that we needed.

"We have the popular saying: He who seeks shall find. A year ago one of the managers of our company received the assignment of seeking out reserves for mutually beneficial trade in Khabarovskiy Kray and on the BAM. He travelled to Khabarovsk several times, talked with specialists and with managers of Soviet organizations and as a result we have an abundant choice of beneficial contracts.

"It is known that the BAM regions are rich in timber. Our company has sold shredding machines to the Dal'lesprom Association for processing wood into commercial chips. Our company will receive part of the products as compensation for the equipment.

"Both the Soviet side and we are interested in obtaining bark-free chips. Equipment for cleaning chips has been developed in Japan on our orders and it is undergoing tests. If the tests are positive, the machines will be sold to Dal'lesprom. In this case the procurement of commercial chips will increase at least twofold.



"And here is another prospect. It is known that salmon species--Siberian, humpback and others--spawn at the headwaters of the mountain rivers of the Soviet Far East and then the fry "go to pasture" to different regions of the Pacific Ocean. They return to the mountain rivers within 3-4 years to spawn. But fishermen from different countries, including Japan, catch the salmon schools in the ocean.

"Both the Soviet and Japanese (and I think other) peoples are interested in restoration of the salmon schools. On this basis, an intergovernment agreement on Japan's participation in measures to restore salmon reserves was signed. A total of 28 fish-breeding plants are now operating in the Soviet Far East. Consulting with Soviet specialists, the Progress Company has ordered equipment to construct two fish-breeding plants.

"We are confident that trade relations between our countries will get on a normal track in the near future. The sooner this occurs, the better it will be for all of us."

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## RAILROAD

### UZBEKS ASSISTING IN BAM CONSTRUCTION

Tashkent PRAVDA VOSTOKA in Russian 12 Jan 83 p 4

[Article by R. Biktagirov, special APN correspondent for PRAVDA VOSTOKA:  
"Uzbek Ambassadors on the BAM"]

[Text] PRAVDA VOSTOKA has reported how an Uzbek patronage party was greeted on the BAM. It has now become known that the letter of the chief of Glavbamstroy [Main Administration for Construction of the Baykal-Amur Railway Line] K. V. Mokhortov, in which gratitude was expressed for model training of the detachment for working under severe conditions, was received at the Uzbek SSR Council of Ministers.

The comments of the deputy chief of the Main Administration A. K. Vasil'yev, who just returned from a trip along the route, include: "The southerners prepared skillfully for winter. One is amazed at the grouping arrangement of the Uzbek housing settlements. They deployed the rail car workers not by street as usual, but in one area of eight units each--in a unique square covered by a common roof. The unusual multi-apartment structure has been enclosed with flat roofing slate and has been heated. This is a new procedure on the BAM and, it must be said, merits attention in all respects: both from the viewpoint of aesthetics and from aspects of requirements on living conditions."

The number of workers at Uzbamstroy has now passed 200. The first arrivals began on construction of the production base, installed a saw frame and constructed a good warehouse. It became clear even after the departure of the first detachment that it lacked the Druzhba saws, necessary for felling timber, in its technical arsenal. Since the republic does not have them, express messengers were urgently dispatched to Perm. The scarce machinery was delivered by aircraft by a relay-race of friendship.

The existing rail line from Tynda presently reaches only to Khani, the boundary of Amur and Chita Oblasts. Hundreds of additional kilometers remain to Kuanda and Leprindo. Transshipping goods across the bald mountains, along the road next to the route, as it turned out, is a difficult and dangerous matter. Therefore, the question was raised of providing all-terrain transport. This problem was also resolved successfully. The latest Ural vehicles, which were dispatched from Chelyabinsk, recently left Tashkent for Uzbamstroy.

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## RAILROAD

### MOSCOW METRO TO OPEN TESTING FACILITIES, TEST TRACK

Moscow TRUD in Russian 3 Oct 82 p 1

[Article by B. Kolesnikov: "Metro Test Facilities"]

[Text] A feasibility study for constructing experimental test facilities for rolling stock structures and hardware for the metro has been worked out for the first time in Soviet practice.

The new equipment for the metro is very difficult to test on existing lines. The metro stations are open to passengers for 9 hours per day. The remaining 5 hours are scheduled literally in seconds: for return of rolling stock to the depot and for the morning departure of them onto the line, for preventive maintenance inspections and repair work. It is practically impossible to test new escalators at operating stations. That is why it was decided to create in the near future a special experimental base with test track on the territory of the experimental ring of the All-Union Scientific Research Institute of Railway Transport (VNIIZhT) at Shcherbinka, near Moscow.

"The metro test track will permit specialists to predict more reliably the conditions for design, construction and operation of underground railroads and also to improve all metro hardware," relates the metro department manager of VNIIZhT, Candidate of Technical Sciences A. Glonti. "The durability and operating reliability of track elements, contact rail, rolling stock, electric supply devices, automatic interlocking, communications, automatic train control systems and so on can be determined on the experimental track."

Specialists have calculated that a considerable reduction of intervals can be achieved if the speed of metro trains is increased by 10 kilometers (it now reaches 90 kilometers per hour on our lines). Let us say that the minimum interval is now 90 seconds and that it can be reduced to 75 seconds. Because of this, three additional pairs of blue expresses can travel on the line per hour. This means that the passenger traffic volume can be considerably reduced on the most intensive sections. Of course, high-speed tests will be conducted at the new test facility.

New escalators are also undergoing a careful check. Such as, for example, escalators with variable speed. During "peak" hours, they can raise and lower metro passengers at a higher speed than during ordinary hours.

Other important tests will also be conducted at the test facilities.

## RAILROAD

### CONSTRUCTION OF MOSCOW METRO'S TRET'YAKOVSKAYA STATION DETAILED

Moscow MOSKOVSKAYA PRAVDA in Russian 19 Nov 82 p 1

[Article by V. Krakhotina: "Junction of Four Transfers"]

[Text] Moscow metro builders should turn over the metro station at the center of the capital--the Tret'yakovskaya station of the Kalinin radius--by the end of the current five-year plan. Its construction has been entrusted to builders of SMU-7 [Construction and installation administration], Mosmetrostroy [Moscow Metro Construction], who have already left their marks on it.

It is planned to join the Tret'yakovskaya station in the future with the deep-lying Arbatskiy radius and thus to extend this line from Kievskaya station to the region of Ochakov. But this is in the remote future. The present designation of the new metro station is to provide transfers between the Kalinin, Kaluga-Riga and Gorkiy-Zamoskvoretskaya lines by forming a transfer junction of three stations--Tret'yakovskaya and the Novokuznetskaya stations. This terminal will also lighten the load of the exiting transfer terminals at Novokuznetskaya station of the Kaluga-Riga line, which is presently unable to cope with the large passenger flow, and on the terminal at the Marksistskaya station.

The Tret'yakovskaya station is the pylon type. It was erected in parallel with the Novokuznetskaya station of the Kaluga-Riga line and will have an entrance on ulitsa Bol'shaya Ordynka, which connects with the already existing entrance.

The train traffic at these metro stations will be organized by the integrated scheme when trains of different lines moving in the same direction approach the platform. In this case the passengers going in the same direction need only change to the opposite platform to transfer from one underground route to another, while those travelling in opposite directions need only use the stairs at the center of the hall. This version is well known to Moscow residents at the Ploshchad' Nogina station.

Two transfer points will be constructed between the new Novokuznetskaya station of the Gorkiy-Zamoskvoretskaya line: from the end of the middle hall of Tret'yakovskaya station to the center of the middle hall of Novokuznetskaya station and from the middle hall of Tret'yakovskaya station to the ends of the side platforms of Novokuznetskaya station.

The additional transfer point will connect the middle hall of Novokuznetskaya station of the Kaluga-Riga line to the ends of the side platforms of the station of the same name of the Gorkiy-Zamoskvoretskaya line.

The new transfer junction will not only be one of the largest in the Moscow metro, but also one of the most convenient to passengers. The layout of the junction, carried out by specialists of the department of routing, operation and geodesy of the Metrogiprotrans Institute [State Planning and Surveying Institute for the Construction of Subways and Transportation Facilities], has received the highest marks of metro workers.

Construction of four transfer points at the same station is a complex engineering problem. The matter is complicated even more by the fact that mechanization of their construction at Mosmetrostroy is at a low level. As a decade ago, the rock is being excavated by the drilling-explosive method with the face being drilled with hand drills, while the structures are being assembled with winches. Concrete pumps and pneumatic concrete feed machines are essentially not being used in laying concrete, although this technology has been available for a long time. It is no accident that erection of these structures remains as before a most laborious matter.

The collective of Moscow metro builders is faced with construction of transfer points at many other stations. Therefore, the problem of mechanization in construction of these excavations must be solved today.

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## RAILROAD

### MINSK METRO CONSTRUCTION CONTINUES

Moscow GUDOK in Russian 3 Nov 82 p 4

[Interview of first deputy chairman of Ispolkom, Minsk City Soviet of Working Peoples' Deputies, A. Yakimchuk by APN correspondent N. Buldyk]

[Text] [Question] What is the 'prehistory' of the Minsk metro?

[Answer] Minsk is being developed at rapid rates. It occupies first place among the Soviet cities with a million residents in population growth. For example, we assumed that the millionth Minsk resident would appear in 1980, but he was born 8 years earlier. They calculated that we would pass the two million mark in the year 2000, but this will apparently occur much earlier: there are almost 1.5 million residents in Minsk today. In short, we began to construct a metro 4.5 years ago to solve the transport problem, and it is becoming ever more acute in the city.

[Question] And to construct it rapidly. Obviously the experience of metro builders, many of whom learned in building the Moscow, Kharkov and Tashkent metros, is being felt.

[Answer] This undoubtedly played its own role. Moreover, we are using new methods in some cases. Thus, the technique of constructing tunnels by using finishing pressed in one piece has been developed for the first time at Minsk in Soviet practice. Concrete is pumped at a pressure of 5-6 atmospheres into the metal form of a mechanized unit and is then pressed into the rock. Thus, expensive special tubing for reinforcement is no longer necessary.

The fact that we learned how to develop a solid production base--a complex of shops that almost completely meet all needs of the construction project and also a special school that trains metro personnel--is also of important significance. And finally, the active participation of the city residents is important. They hold Saturday and Sunday work days and help to maintain green plantings, transplanting trees from the construction zone to parks and squares.

[Question] As is known, the Minsk metro will be shallow. To what is this related?



[Answer] To the soil characteristics. It is very complex. We had the choice of either placing the metro 250-270 meters deep or of raising it. We adopted the second route, which will guarantee less expensive (one-third) and more rapid construction. Although of course this posed new problems. For example, we had to think how to guarantee the quietness of the metro in this case.

[Question] And this problem was solved?

[Answer] In general, yes. A special antinoise protective section was included in the design, in development of which several scientific research institutes participated. Nevertheless, there are usually unforeseen difficulties. For example, the enormous boulders encountered on the route. Special shafts had to be dug to remove them. Or the "floating" soils that form unique underground bogs. And there is still the Svisloch River--one of the most complex obstacles.

[Question] What is the line of the first unit?

[Answer] It is 8.7 kilometers long. A trip from the first to the last station (eight in all) will require no more than 12 minutes. The trains will transport 15,000 passengers per hour in one direction. A number of unique technical innovations will be adopted here in the electrical equipment and in the communications and telemechanical equipment. The high-speed rolling stock will be made up of the latest comfortable rail cars that are now being tested.

The artistic and monument formulation of the stations is being given great importance. This work has been entrusted to the best Belorussian architects and artists. For example, a group of artists is working under the supervision of meritorious figure of art of the BSSR A. Kishchenko at the Chelyuskin Park station. Like other stations, this will be kept in the Belorussian national style.

[Question] The opening of the Minsk metro is planned for July 1984, that is, 6 months earlier than planned. And what are the further plans?

[Answer] Construction of two additional units is planned. One of them will link the residential rayons in the southwest and west of Minsk to the zone where the main industrial enterprises are located and the other will pass from the northwest to the southeast.

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## BRIEFS

**NEW COMMUNICATIONS EQUIPMENT**—The wire communications laboratory of the All-Union Scientific Research Institute of Railroad Transportation and the department of radio communications of the design bureau of the Main Administration of Signaling and Communications of the Ministry of Railroads have developed the class PU-4D and PU-1R equipment for interlinking radio and wire channels. The new equipment, being produced by the Dnepropetrovsk Electrical Engineering Equipment Plant of the Ministry of Railroads, is superior to the existing PU-62 equipment in functioning reliability, damping in the feedback loop, noise resistance, and sensitivity to speech signals. The equipment is figured to connect two circuits of selective group communications. The annual savings from introduction of the PU-4D alone in the railroad system will be about 412,000 rubles. [By V. Antonov] [Text] [Moscow GUDOK in Russian 6 Oct 82 p 3] 11176

**CONCRETE SPRAYER**—Moscow—The All-Union Extension Institute of Railroad Transportation Engineers, together with the road construction trust of the Moscow Railroad and the Kazan Polytechnic Institute, has designed a vibro-ejection concrete spraying machine. Its purpose is to apply a protective layer of a concrete mix to the rocky surfaces of mountain slopes, excavations, pits, potential sliding slopes, and the surfaces of stone and reinforced concrete transportation structures. This coating reliably protects the objects against the destructive action of atmospheric precipitation, wind, and changes in air temperature. Series production of the concrete sprayer is being organized at enterprises of the Moscow Railroad. The annual economic impact of its use will be about 15,000 rubles, and it has a ceiling price of 2,000 rubles. [By Yu. Adrianov, professor and doctor of technical sciences, and V. Voyevoda, candidate of technical sciences] [Text] [Moscow GUDOK in Russian 16 Nov 82 p 4] 11176

**CZECHOSLOVAK LOCOMOTIVE**—The Skoda Production Association in the Czechoslovak city of Plzen is producing electric locomotives for its own railroads and for the Soviet Union and Bulgaria. In the near future plans envision producing up to 200 locomotives a year. For Soviet railroads they will continue to produce DC locomotives of classes ChS2T, ChS6T, ChS7T, and ChS200T and the AC locomotives ChS4T and ChSV. Bulgaria will receive the Ye42 and Ye43 electric locomotives and new Ye43R engines, which have a maximum speed of 130 kilometers an hour. In addition, in 1983 the Skoda Plant will begin producing industrial electrical locomotives for work at power plants in Yugoslavia. [Text] [Moscow GUDOK in Russian 16 Nov 82 p 4] 11176



CLEANING AGENTS TESTED—Four types of chemical agents for washing the exteriors of passenger cars and eight types for the interior have been tested in Czechoslovakia. First they determine the degree of dirtiness of the outside of the car bodies. Cars which are working on electrified sectors have 83-90 percent dust from the brake blocks, up to one percent copper particles from the catenary line, 10-16 percent dust from the roadbed, and 0.1 percent soot from the car heating system. In the case of diesel traction 73 percent of the dirt is iron oxides, 4.4 percent is dust, 2.2 percent is sulphur oxides, 17 percent is oil and coal, and 3.4 percent is moisture. Stronger detergents and stronger mechanical action are required to remove the dirt that forms with diesel traction. [Text] [Moscow GUDOK in Russian 16 Nov 82 p 4] 11175

NEW REPAIR SHOP—Irkutsk—The state commission has accepted a new building built next to the shop for hoist repair of electrical locomotives at the local depot. The electrical machine shop has been housed in the new structure. Its production areas make it possible to produce twice as much output. Depot efficiency workers have devised a number of stands and devices that make it possible to mechanize the dismantling and assembly of the machine. The shop is close to the three-story sanitary and services building opened earlier. [Text] [Moscow GUDOK in Russian 4 Nov 82 p 4] 11176

WORK PROBLEMS CORRECTED—A group of repair workers at the Ush-Tobe locomotive depot of the Alma-Ata Railroad wrote a letter to the editors about the poor management and violations of the staff schedule in the toolmaking shop, which has a negative effect on timely repair of diesel locomotives. As S. Prisyazhnyuk, deputy chief of the Main Administration of Locomotives, has reported, the facts in the letter were confirmed. The chief of the Ush-Tobe depot has been ordered to straighten out affairs in the toolmaking shop by correlating the names of occupations with the jobs actually done and establishing appropriate pay and annual vacation time. [Text] [Moscow GUDOK in Russian 21 Nov 82 p 2] 11176

EXPOSE FOLLOWUP—On 24 December the newspaper GUDOK published a note from Comrade Glambovskiy, car inspector and train traffic safety examiner, under the headline "How Breakdowns Originate." The subject was the extremely poor organization of work at the car technical servicing point of Cheremkhovo Station and poor supply of spare parts there. In connection with this minister of railroads N. S. Konarev ordered the chiefs of the railroads and road divisions to immediately review the organization of work at each car technical servicing point and take effective steps to eliminate problems. Comrade Komarov, chief of the Irkutsk division of the Eastern Siberian Railroad, Comrade Konyushenko, chief of Cheremkhovo Station, and Comrade Frolov, chief of the car depot at Cheremkhovo, are being called to a meeting of the board of directors of the Ministry of Railroads to give explanations for the unsatisfactory work of the Cheremkhovo servicing point and to report on steps taken to comply strictly with procedures for technical servicing of the cars. [Text] [Moscow GUDOK in Russian 30 Dec 82 p 2] 11176

AUTOMATIC DIAGNOSIS SYSTEM—The collective of the Depot imeni S. M. Kirov received help from scientists at Kharkov Institute of Railroad Transportation Engineers in building the country's first automated line for comprehensive diagnosis and servicing of locomotives. Its final element, electronic instruments

to examine and regulate the fuel equipment of the engine, has now begun working. The comprehensive diagnosis system developed jointly by the scientists and railroad workers has already produced practical results. The reliability of diesel engines has improved noticeably, and the number of malfunctions occurring on the road has decreased. Since the start of the year a total of about 10,000 additional cars carrying national economic freight have been transported thanks to reducing downtime and accelerating the turnaround time of rolling stock.

[By M. Khabinskiy] [Text] [Kiev PRAVDA UKRAINY in Russian 24 Aug 82 p 2] 11176

**NOVOSIBIRSK METRO CONSTRUCTION**—The first subway (metro) line in Siberia is under construction in Novosibirsk. Construction is now underway on all segments of the first phase. This line of about 13 kilometers will connect the center of the city with the left-bank industrial region. The first trains of the Novosibirsk Metro will run from Vokzal'naya Station to Studencheskaya Station at the end of this five-year plan. [Excerpt] [Moscow GUDOK in Russian 12 Nov 82 p 2] 11176

**NEW TSELINOGRAD ROAD**—Tselinograd—The first test runs have been made on the 106-kilometer electrified segment from Tselinograd to Ak-Kul'. Thus the collectives of the Order of Lenin Tselintransstroy [Tselinograd Transportation Construction] Trust and the Tselinograd division of the railroad fulfilled their joint socialist obligations to put this project on line ahead of schedule in honor of the 60th anniversary of the formation of the USSR. The great honor of taking the first train under electric traction was given to A. Asanov, winner of the Order of Friendship of Peoples and one of the best engineers of the Tselinograd locomotive depot. Upon completion of start-up jobs, which the workers of the two allied organizations are doing at a shock-worker pace, regular traffic will begin on the new electrified segment. [By V. Gapeyev] [Text] [Moscow GUDOK in Russian 15 Nov 82 p 4] 11176

**FAR EASTERN TIMBER ROAD**—Khabarovsk—A new timber-carrying railroad has opened the way to the rich taiga forests of the Sidim region in Khabarovsk Kray. The 120-kilometer line, which runs along the slopes of hills, through river valleys, and across "mari" [Siberian peat bogs], was turned over for operation ahead of schedule. This signified fulfillment of an important point in the socialist obligations undertaken in honor of the 60th anniversary of the USSR. The timber industry has become a leading sector of the Maritime region. By the end of the five-year plan the All-Union Dal'lesprom [Far Eastern Timber Industry] Association will be shipping 27 million cubic meters of timber a year to customers. [Text] [Moscow GUDOK in Russian 27 Nov 82 p 1] 11176

**NEW BELORUSSIAN ROAD**—Stolbtsy—Start-up work on the new electrified segment from Stolbtsy to Baranovichy, about 70 kilometers long, is being completed. The collectives of the Beltransstroy [Belorussian Transportation Construction] Trust and specialized Construction-Installation Train No 702 labored outstandingly here. They put in the supports and installed the catenary system ahead of schedule. A few days ago the first electric train ran from Minsk to Baranovichy-Polesskiye Station. Specialists concluded that the catenary system is in good

condition. The electrification workers prepared this fine gift in honor of the 60th anniversary of the formation of the USSR. Their shock labor will make it possible to launch eight pairs of electric trains here as early as December. [Text] [Moscow GUDOK in Russian 8 Dec 82 p 1] 11176

BAM CONSTRUCTION CONTINUES—Severobaykalsk—The relay of shock work by Komsomol members and young people dedicated to the 60th anniversary of the formation of the USSR has begun on the Buryat segment of BAM. The inspection of shock work and the achievements of participants in the most important all-Union Komsomol construction project will proceed along the communities of BAM construction workers from Davan to Vitim. The community of Granitnyy, located at the west end of the Baikal tunnel, is beginning the relay. At a ceremonial meeting Komsomol members of tunnel detachment No 19 will present their labor report to the headquarters of the All-Union Komsomol Central Committee on the Buryat segment. It will report completion of construction work in the tunnel ahead of schedule. During the relay the results of socialist competition among young people under the slogan "60 weeks of shock work for the 60th anniversary of the formation of the USSR" will be summarized. The winners in this mass movement which has involved participation by representatives of more than 60 nationalities will be named at the 13th assembly of young production leaders. [By G. Ul'yanova] [Text] [Moscow GUDOK in Russian 1 Dec 83 p 1] 11176

NEW RAIL CONSTRUCTION LAGGING—The Ekibastuz railroad workers have received their first deluxe diesel train for transporting construction and operations workers at the power plant site. Four more trains are coming. Construction is now being completed on the sidings and unloading areas so that traffic can begin in December. The Pavlodartransstroy [Pavlodar Transportation Construction] Trust (chief — A. Shaposhnikov) was supposed to turn over the repair shop building in October. Its frame is ready, but the building has no roof, no glass in the windows, no floors, and no inspection pits. The area around is riddled with trenches. As a result, while the trust fulfilled 45.8 percent of the plan for the first nine months for the entire locomotive depot, it did just 15 percent for the primary projects, the current repair shops. There is not even a place to park the diesel train, let alone to repair it. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 49, Dec 82 p 19] 11176

NEW KAMA BRIDGE—A large railroad bridge over the Kama has been put into operation near the city of Brezhnev. The enterprises of the Lower Kama territorial production complex have been given a shorter route to the Urals and Siberia. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 1, Jan 83 p 4] 11176

NEW AMUR TERMINAL—A new railroad terminal has been built in the city of Svobodnyy in Amur Oblast. It is one of the largest and most comfortable along the Transsiberian railroad. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 1, Jan 83 p 4] 11176

SOVIET SHIPPING FIGURES FOR 1977-1981

Moscow MORSKOY FLOT in Russian No 1, Jan 83 pp 54-55

[A table excerpted from an article by A. Kalugin: "Over the Precipice of Crisis (A Maritime Review)" under the heading: "Abroad".]

[Text] The Structure of Soviet Merchant Fleet Shipping, 1977-1981

(Millions of tons)

Kinds of shipping	1977	1978	1979	1980	1981
All Soviet fleet shipping	220,3	229,4	226,6	228,3	223,3
Including:					
Soviet foreign trade cargoes	110,6	113,3	110,2	113,8	111,4
Coastal shipping	78,8	82,5	78,6	77,7	80,2
"Cross-trade" shipping	30,9	33,6	37,9	36,8	31,8
"Cross-trade" shipping as a proportion of the total volume of Soviet fleet shipping, in percent.	14,0	14,6	16,7	16,1	14,2

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## OCEAN AND RIVER

### BREAKDOWN OF USSR MERCHANT FLEETS AS OF 1 JULY 1982

Moscow MORSKOY FLOT in Russian No 1, Jan 1983 p 39

[A one-page tabulation of Soviet commercial ships under the heading: "The USSR Register of Shipping reports information about the USSR Maritime Fleet according to Register records as of 1 July 1982 with the distribution of the fleet by ministries and departments." ]

[Text] Key for the Table:

- |                                     |                               |
|-------------------------------------|-------------------------------|
| 1. Kinds of ships                   | 14. Containerships            |
| 2. Ministry of the Maritime Fleet   | 15. Roll-on/Roll-off ships    |
| 3. Ministry of the Fishing Industry | 16. Tank ships                |
| 4. Other                            | 17. Oil tankers               |
| 5. Totals                           | 18. Gas carriers              |
| 6. Number of ships                  | 19. Chemical carriers         |
| 7. Gross tonnage, register-tons     | 20. Oil/Bulk/Ore carriers     |
| 8. Deadweight, tons                 | 21. Fishing ships             |
| 9. Passenger and passenger-cargo    | 22. Special purpose ships     |
| 10. including                       | 23. Dredges, etc.             |
| 11. Ferries                         | 24. Service & auxiliary ships |
| 12. Dry cargo                       | 25. Tugs                      |
| 13. Timber carriers                 | 26. Icebreakers               |
|                                     | 27. Totals                    |

[Table is on following page.]

# USSR MERCHANT FLEETS

1 July 1982

(Self-propelled ships with a gross tonnage of 100 register tons or more.)

(1) Код наименование	(2) Всего			(3) МРТ			(4) Тоннаж			(5) Всего		
	Единиц	Всего	Двадцать	Единиц	Всего	Двадцать	Единиц	Всего	Двадцать	Единиц	Всего	Двадцать
	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) Пароходы и прицепные суда	181	607 366	175 613	11	6 653	3 650	67	24 056	3 814	259	638 075	185 077
(10) в том числе												
(11) паровые	45	188 720	57 964	—	—	—	—	—	—	45	188 720	57 964
(12) Суда грузовые	1 193	8 421 636	11 510 868	544	1 436 297	1 361 298	258	445 456	534 814	2295	10 303 389	13 406 950
(10) в том числе												
(13) навалочные	341	1 463 964	2 045 222	—	—	—	2	9 628	13 560	373	1 479 392	2 058 782
(14) контейнеровозы	46	350 613	374 417	—	—	—	—	—	—	46	350 613	374 417
(15) рефрижераторы	54	350 070	479 810	—	—	—	—	—	—	54	350 070	479 810
(16) Мельничные	325	4 406 891	6 739 837	107	230 256	286 012	5	40 077	58 298	437	4 679 224	7 084 147
(10) в том числе												
(17) нефтеналивные	298	4 188 620	6 498 677	88	198 943	249 683	3	36 694	54 978	389	4 424 257	6 803 338
(18) газовозы	11	186 625	201 398	—	—	—	—	—	—	11	186 625	201 398
(19) танкеры	3	9 345	9 960	—	—	—	—	—	—	3	9 345	9 960
(20) Комбинированные	10	625 143	1 085 952	—	—	—	31	83 669	88 474	41	708 812	1 174 426
(21) Рыболовные	—	—	—	2549	3 307 442	1 839 886	4	3 375	1 610	2573	3 310 817	1 841 496
(22) Специального назначения	57	203 090	135 093	214	1 589 286	1 211 586	154	182 529	83 452	427	1 974 905	1 430 129
(23) Технические	204	179 425	140 463	30	18 377	9 530	181	189 031	116 736	415	386 833	266 729
(24) Служебно-эсплораторские	482	446 357	325 055	336	138 234	90 770	186	70 107	38 556	1004	654 693	454 381
(10) в том числе												
(25) буксиры	281	89 214	34 716	204	84 368	36 997	133	49 266	20 006	618	222 848	91 719
(26) ледоколы	34	219 963	99 367	—	—	—	—	—	—	34	219 963	99 367
(27) Итого	2752	14 891 903	20 112 881	3811	6 726 545	4 804 730	888	1 038 300	925 754	7451	22 656 718	24 843 365

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TEXT OF INTERVIEW OF INTERLIGHTER'S GENERAL DIRECTOR

Moscow MORSKOY FLOT in Russian No 10, Oct 82 pp 5-7

[Interview with V. P. Ushakov, general director of Interlighter, by special MORSKOY FLOT correspondent at Interlighter headquarters in Budapest; date not given: "Interlighter at a New Stage, Our Interview"]

[Text] Readers will have read this journal's account (MORSKOY FLOT, No 7, 1980) of the formation of and first steps taken by the Interlighter international industrial shipping enterprise. This independent commercial enterprise, formed by agreement between the governments of the NRB [People's Republic of Bulgaria], the VNR [Hungarian People's Republic], the USSR and the CSSR, constitutes a fundamentally new stage in the evolution of socialist economic integration in the sphere of ocean-going transport.

The legally equal partners comprising Interlighter include the Bulgarian River Steamship Company, the Hungarian Joint-Stock Shipping Company, the Soviet Danube Steamship Company and the Czechoslovak Danube Steamship Company.

Some four years ago the lighter transport *Yulius Fuchik* flying the Interlighter flag from her mast left the Danube estuary on her first voyage to ports in the Indian Ocean. The years since then have seen the new enterprise grow stronger and gain authority in the eyes of consigners in the Danube countries as well as consignees and increase the volume of its shipments and enlarge the sphere of its commercial activity. Our special correspondent recently visited Interlighter's headquarters in Budapest and met with senior officials of the enterprise.

V. P. Ushakov, Interlighter's general director, received our correspondent in his office on Naberezhnaya Dunaya [Danube Embankment].

[Question] Vladimir Petrovich, it has already been over two years since the last time we talked with you. MORSKOY FLOT readers would be interested to know what changes have occurred in Interlighter's economic-administrative and commercial activities since then. We know, for example, that you have achieved no small success in increasing your shipping volume and expanding the range of cargoes you handle as well as in establishing

new freight traffic routes. What has been the "secret" of the rapid growth of your enterprise?

[Answer] A lot has changed. Interlighter was just taking its first steps back then, but now, in clearly demonstrating the potential of the multilateral industrial enterprises set up by the socialist states, whose formation was called for in the Integrated Program adopted by the Council on Mutual Economic Assistance, you might say that our enterprise has entered a new stage in its development.

As you will recall, we were initially operating a single lighter transport, the *Yulias Frolik*, which we leased under long-term contract from the Soviet Danube Steamship Company. It carried cargoes from the Danube to India, with calls to Pakistan. Two and a half years ago we leased a second lighter transport from this steamship company. In April 1980 Interlighter opened a second line, this one running between river ports on the Danube and river ports in Vietnam and Kampuchea on the Mekong River, with calls to the seaports of Saigon (Vietnam) and Penang (Malaysia). The lighter transport line between the Danube and the Mekong has made it possible to establish a stable transport link between ports of European socialist countries and the socialist countries of Southeast Asia.

Your journal has already told its readers about the objectives and tasks of the international lighter transport system, but it would surely not be entirely superfluous briefly to review its basic principles. The basic objective of our enterprise is to satisfy as fully and as efficiently as possible the Danubian countries' foreign trade shipping requirements. Countries which have no outlet to the sea are forced to bear additional transport costs in order to trade with partners overseas because they have to ship their cargoes through the seaports of other countries. The idea of using the Danube to ship cargoes directly to ports in countries overseas is now a comparatively old one. Practical realization of this idea on any large scale, however, became possible only with the development of a fundamentally new river-ocean transport technology employing the lighter transport system, as well as as a result of the development of collaboration between shipowners of the socialist countries along the Danube.

The lighter transport shipping system is essentially a simple one: lighters are loaded simultaneously at many river ports on the Danube along the entire length of the river from Izmil (USSR) to Regensburg (FRG) and then, by a certain, specifically scheduled, date, towed to the mouth of the Danube, where a mother ship (that is, a lighter transport) takes on a complement of 26 loaded lighters. The lighter transport takes on the lighters over a period of from 14 to 16 hours using its own loading and handling equipment and then at great speed delivers them to seaports of other continents. After unloading the lighters brought from the Danube in a particular seaport, the lighter transport will there take on another complement of 26 lighters carrying cargo for river ports along the Danube and return with them to the Danube estuary, where by the time it arrives the next complement of loaded lighters will be ready, and the cycle is repeated.

The lighter transport remains in continuous operation. A sufficient number of lighters, which serve simultaneously, as it were, as temporary warehouses and as means of delivering cargoes, permits us to reduce losses due to ship idletime to a minimum, speed up the delivery of goods, to eliminate the need for additional transshipment and to reduce fuel consumption and labor costs during shipments.

The expansion of lighter transport traffic has opened up new possibilities for the foreign trade organizations of the enterprise's member countries, as well as for firms of many Danubian countries in their trade in the markets of countries served by Interlighter ships. So there's really no "secret" to the enterprise's rapid growth. The demand for direct transoceanic shipments was there, and by utilizing a new, highly efficient technology we were able to meet the demand for these shipments on conditions advantageous for the shipper.

[Question] Could you explain in a little more detail the advantages the lighter transport system offers over the conventional multimode shipments involving the transfer of cargoes from the railway system or river-going vessels onto oceangoing ships?

[Answer] These advantages lie, first of all, in the large carrying capacity the lighter transport system offers and the short periods of time required to deliver shipments from consigner to consignee. Suffice it to point out that the average lighter transport round trip from the Danube to India and back takes 32 days, 46 days from the Danube to the Mekong and back. This is by no means the best we can do, though. We are expecting within the near future to be able to cut these times. But even as our capabilities stand today, the time required to ship a cargo and deliver it to its destination has been more than cut in half as compared with the traditional system (railroad-seaport-oceangoing vessel).

The second advantage is the regularity of the traffic. Lighter transports run on a schedule, and the shipper will be able to know exactly when his consignment will reach his overseas partner.

Thirdly, great importance attaches to the versatility of our shipping capacity, that is, cargoes of the most varied properties and characteristics can be shipped on one voyage in the 26 lighters.

And finally, the increased cargo security made possible by the elimination of transshipments is also of no little importance. It becomes possible as well to accumulate and temporarily store cargoes in port prior to shipment (directly on the lighters themselves).

[Question] Specifically, what kind of freight traffic volumes are we talking about here and what types of cargo are carried on Interlighter lines? Do you have any competition from other steamship companies?

[Answer] I will answer the second part of your question first.

At first, Interlighter encountered strong opposition on the part of capitalist shipping conferences serving routes between Europe and regions of the Indian Ocean and Southeast Asia. But we operate directly out of Danubian ports, out of the center of Europe, and opponents of the lighter system are unable to propose any more efficient transport technology. Interlighter is the only organization in Europe employing the lighter transport system. So we don't have any real rivals; but there are the malcontents, of course.

The introduction of lighter transport traffic is stimulating the development of Danube shipping because it is making it possible to attract larger cargoes to this the largest international river in Europe. We are at the same time seeing the river ports becoming increasingly more important, coming to play a greater economic role; they essentially are doing the work of seaports.

Now about the cargoes. From the time we began our regular operations until January 1982 our ships have carried more than 1.1 million tons of Danubian foreign trade shipments. Of this figure, some 800,000 tons (74 per cent) comprised shipments for Interlighter member countries, the remainder (26 per cent) cargoes carried for other charterers.

Lighters carry a wide variety of cargoes. They include large-bulk cargoes such as metals, chemical fertilizers, pipe, paper, wood products, cotton, oil cake and general cargoes ranging from consumer goods to instruments and equipment. Widely recognized among charterers are Interlighter's shipments of large and heavy cargoes like locomotives, transformers, buses, road-building equipment and tanks. It has been successful with its shipments of bulk rubber as well. Lighters deliver this costly product from Malaysia, Vietnam and Kampuchea directly to consumer factories on the Danube without transshipment. They deliver it in good condition and in the shortest periods of time possible. If all the cargoes we deliver by lighter had to be transported by railroad we would need at least 30,000 cars.

The foreign trade organizations of our enterprise member countries are making increasing use of Interlighter for their shipments. Unfortunately, however, I have to say that not all charterers from the socialist countries are properly evaluating the advantages to be derived from utilizing long-term contracts with Interlighter, preferring instead to tow individual parts of a cargo on particular runs.

[Question] Are Interlighter's operations limited only to lighter shipments?

[Answer] No, they aren't. In the first place, I would like to point out that last year we introduced our container operations, employing for this purpose the reserve capacity available on our lighters and carrying the containers on the lighter hatch covers.

We can carry as many as 150 containers on top of 10 lighters on each run. The enterprise now has some 700 containers in service. This figure will rise to 1600 by the end of 1982 and to 3000 at some point in the future. The introduction of container traffic in the lighter transport system, as well as more efficient utilization of lighter transport capacity, is making it possible to expand the range of services we can offer shippers. Containers are particularly convenient for shipping costly, high-tariff cargoes. The lighter transport system's operation in accordance with a strict schedule is related to its introduction of shipping line components for nonself-propelled shipping on the Danube. The new cargo transport technology adopted on the Danube has accordingly required a new organization and improved coordination of fleet traffic and seaport operations.

Interlighter has concluded an agreement covering the provision of agency services, towing and lighter maintenance with steamship companies of all the Danubian countries. The past period saw Danube shipowners perform more than 3400 lighter towing operations and by tonnage leased from other steamship companies transport over 250,000 tons of Interlighter cargo, payment for all these services being made in accordance with provisions of the Bratislava agreements. This shows that Interlighter is utilizing available reserve capacities of Danubian steamship companies, which is to the economic advantage of our partners.

[question] What deficiencies can you identify in Interlighter's performance and what are the prospects for its near-term development?

[Answer] Our primary shortcomings and difficulties are associated with the rapid growth of the enterprise and its need for large capital investments. The construction by the Soviet Danube Steamship Company of a special deep-water seaport at the mouth of the Danube for loading lighters onto their mother ships has solved many of our problems. But the capacity of Danube river ports unfortunately lags behind our requirements, particularly with respect to general piece cargoes.

The long periods of time our lighters have to wait before they can be unloaded in the ports of India, Pakistan and Vietnam are another problem. Here we are planning to monitor our agent operations more closely and develop our own material base.

Lighter hatch covers have to be improved. We have to improve our hatch cover repair operations as well and set up specialized ship-repair facilities. But all these deficiencies can be entirely eliminated and will certainly be remedied within the near future.

The Interlighter council has decided to take further steps to improve the material-technical base of the enterprise.

It is important to note that from its commercial operations Interlighter has at its disposal the resources necessary to undertake these capital-intensive improvements without drawing any further upon those of enterprise participants.

Now about the future. We are planning to expand the ocean regions the lighter transport system can serve by using smaller lighter transports to carry lighters on feeder routes. We will also be expanding our container operations.

In speaking about what the future holds for us I would like to touch upon one other question which some organs of the Western press have dealt with in a distorted manner. They would have it that Interlighter is laying its plans for the future on the basis of an active involvement in traffic on the system of Rhein-Main-Danube canals now under construction. This is not the case at all. We already have a sufficient volume of traffic and a clientele with which we are established in the Danubian countries themselves. But of course, we would, like any shipping enterprise, gladly participate in the provision of transport service to new regions in Europe if this is commercially advantageous to us and if it will not jeopardize business relationships with the shipping clientele we already serve. In any event, we see no direct relationship between the development of Interlighter and the state of affairs with the construction of the new system of canals in Europe.

[question] In conclusion, I would like to ask you briefly to explain how the principles of socialist economic integration find expression in the concrete activities of your enterprise.

[Answer] The essentially integrated nature of the enterprise consists in the fact that within the single Danube lighter transport system as a whole, Interlighter is utilizing fixed capital comprising 200 lighters participants contributed with the creation of the enterprise, 2 oceangoing lighter-transport ships transferred to Interlighter under

lighter's lease by the Soviet Union and thus be made to work for the partners of the enterprise.

From freight received for cargoes shipped Interlighter pays all operating and other costs involved in the transport of these goods by lighter, makes its regular payments on the lease on its lighter transports and pays its administrative/house-keeping costs to include those associated with the functioning of its directorate and representatives. Neither supplementary contributions from the budget of enterprise partner countries have ever been required to maintain interlighter operations for as long as it has been in existence. It has been in the black every year, which has made it possible for it to accumulate resources to support both its normal operations and its future development.

Working within Interlighter's general management (in Budapest) are specialists from all four enterprise partner-countries. Common objectives, collective experience, the possibility of working actively with enterprises and organizations in all four countries and the continuous assistance and cooperation Interlighter enjoys on the part of the Danubian steamship companies participating in the enterprise have all made it possible within a brief period of time to bring the Danubian lighter transport system into operation and to organize the efficient operation of this multilateral joint enterprise.

The key point is that Interlighter gets three-fourths of all the cargoes it ships from foreign trade organizations of the enterprise's partner countries. The rapid and efficient delivery of these cargoes without having to divert them into the railroad or trucking systems or to use port facilities to transfer them onto oceangoing ships is of enormous economic importance to all four of the countries who have created our enterprise.

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## OCEAN AND RIVER

### ODESSA PORT IMPROVES FOODSTUFF CARGO HANDLING CAPABILITY

Moscow MORSKOY FLOT in Russian No 1, Jan 83 pp 12-13

[Article by V. Zolotarev, chief of the port of Odessa: "A Green Light for Foodstuff Cargoes" under the heading: "Management and Economics".]

[Text] Convened in May 1982, the Plenum of the Central Committee CPSU approved a food program for the USSR for the period up to 1990, and measures for its realization.

The measures to provide the branches of the agricultural industry with transportation, packaging and packaging materials constitute an important part of the food program. In particular, maritime transport was given the task: "With the purpose of fully providing for the transport of foodstuff cargoes, create specialized complexes for the transshipment of such cargoes in the Baltic, Black Sea, and Far East basins."

The article tells how port workers in Odessa are working toward the realization of these Party decisions.

Odessa port workers fulfilled the plan for the first year of the 11th Five-Year Plan ahead of schedule - on 13 December 1981. For the successes achieved, port personnel were awarded the challenge Red Banner of the Central Committee CPSU, the USSR Council of Ministers, the VTsSPS [All-Union Central Council of Vocational Unions] and the TsK VLKSM [Central Committee of the All-Union Lenin Communist Union of Youth].

Inspired by the high evaluation of their work, the port workers searched for resources to fulfill successfully the larger assignments of the Plan for 1982, giving special attention to the transshipment of cargoes having great importance in the solution of the foodstuff program, especially since about 90 percent of freight processed in the port is grain, sugar, citrus fruits, meat, and other foodstuffs.

In 1982, the whole increase in the volume of cargoes processed in the port was due to the increased quantity (20 percent) of foodstuffs. Included in this, refrigerated cargoes increased by a factor of 1.4.

How do port personnel achieve such results?

In the first place, it is because improved production processes for cargo operations and modernization of existing equipment with an increase in the amount of it, have permitted reducing the heavy hand work of the dock workers significantly.

For example, on pier No. 22, to mechanize the transshipment of frozen meat carcasses, a special 100-meter long ramp was built, the height of the guard fencing on FD 15 rail car loaders was reduced, and a special cassette was made accommodating three small scoops with cargo. By crane the cassette is transferred to the pier and, after weighing, is moved onto the railway ramp. The loader picks up a scoop, delivers it to the rail car, pushes the carcasses off with a hydraulic device, then replaces the scoop in the cassette, and the cycle is repeated. The cassette with empty scoops is delivered into the hold of the ship for refilling. The new technology for transshipping frozen meat carcasses increased the productivity of labor by a factor of 1.5.

New production processes were created for transshipping citrus fruits, butter in boxes, cheese, and other cargoes. In this, the loading of rail cars is being carried out by means of newly-designed fenced pallets, production equipment, and multifork grabbers.

Work was done on the creation of specialized transshipment complexes on piers No. 3 and 14 where stationary ramp areas also were built. The use here of fenced pallets and multifork grabbers permits full mechanization of operations inside of rail cars.

The assimilation, transport, and transshipment of imported cargoes in packages (flour, tapioca), dried milk, and poultry parts is being done on throw-away pallets which completely eliminates hand work.

In processing poultry on throw-away pallets, an average production line achieved 101 tons per shift while the norm is 80 tons. One of the best specialized crews for processing general cargoes by mechanized methods (the crew of V. Pogrebenko) achieved a record output - 307 tons per shift. The crew came forward with an initiative to improve the norm for the complex in these operations by 10.5 percent.

In bad weather (rain, snow, wind) the transshipment of grain was practically stopped because the change-over from the grab-bucket method of loading to pneumatic transfer took up to 7 or 8 hours. To avoid these delays, two transshipment complexes were created on piers No. 13 and 32 for the transshipment of grain in any kind of weather.

The pneumatic machines were installed on the roofs of the car loaders which reduced the time for preparatory and finishing operations. Experience in the operation of the all-weather complexes in the course of a year confirmed the correctness of the solution adopted.

The technology of transshipping grain by craneships also underwent change. Without taking pier No. 7 out of service, additional railways were laid for the movement of self-propelled car loaders. The throughput capacity of the pier was increased from 144 rail cars per 24 hours to 210.

Thanks to the development together with the staff of the port elevator, of a unified production plan, the throughput capacity at the elevator was successfully increased from 60 to 80 rail cars per 24 hours.

Simultaneously with the introduction of advanced production processes, much attention was given to improving the organization of labor, in the first place, to the creation of enlarged comprehensive crews [UKB] of dock worker and machine operators and their specialization, to assignment beyond transfer complexes, to a change-over to independently accountable crews and to the processing of transport equipment by the method of crew contract.

So, at the grain transshipment complex on pier No. 7 an express-forwarding, enlarged comprehensive crew of 140 men is working, led by a bearer of Labor Honors of the 2nd and 3rd degree, N. Grigorenko. At the all-weather transshipment complex, an express-forwarding UKB of 160 men works under the leadership of I. Samoylov, and at the complex on piers No. 25-26 there is an express-forwarding UKB in which 160 workers work under crew leader V. Plitov.

All ships at the transshipment complex of the 3rd freight area are being processed by four-shift UKB's having 42 men each.

The crews of the 3rd freight area have changed over to independent accountability, are processing the fleet by the crew contract method, and they distribute a bonus from the wage fund in accordance with the coefficient of labor participation [KTP].

All enlarged comprehensive crews assigned to bulk cargo transshipment complexes process two ships simultaneously. This has permitted completely eliminating the losses of working time connected with the completion of the processing of one ship and awaiting the arrival of the succeeding one. It is also provided for a more even burden on the workers during a shift.

These measures, especially the change-over of the collectives of dock workers and machine operators into independently accountable crews with the use of KTP have strengthened labor discipline and have promoted the increase in the creative activities of the workers which assured the successful operations of the port personnel. Because of the initiative of the workers, 38 norms for processing cargoes were raised which yielded a reduction in labor consumption of 42,400 men per hour.

The directive of the Party about increasing the efficiency of the operation of enterprises without additional capital expenditures was taken as a fundamental for port activities. An example of the practical realization of this directive is the work of the specialized complex for the transshipment of raw sugar. This unique facility was put into operation as early as 1973 with a designed capacity of 1 million tons. After 7 years however, the processing of only 700,000 tons has been successfully achieved. There are various reasons for this, both technical and organizational.

The sharp growth in the freight turnover of the port at the beginning of 1980 required reviewing again the capability of each pier for the purpose of raising its throughput capacity.

Starting from that, the in-port management of cargo operations was drawn closer to the location of the processing of ships. Without an increase in the total number of management personnel, a new freight area was formed.

At the specialized complex, four enlarged comprehensive crews were created for the unloading of ships and one such crew is at the railroad station for loading rail cars.

As the result, in July 1982 for the first time the designed capacity of the complex was achieved. The intensity of cargo operations after 2 years had grown from 3,800 tons on a ship in 24 hours to 7,000 to 8,000. On some ships it was still higher. For example, 22,000 tons of sugar were unloaded from the motorship "Zadonsk" in 48 hours.

In the period of the growth of the flow of foodstuffs into the port, a socialist competition was organized for the highest achievements in processing with results summed up weekly. This has played its own positive role. The productivity of one production line has been increased by from 25 to 40 percent. The best results are being achieved by the specialized crews led by N. Tymonen and V. Pogrebenko.

We still, however, have resources which must be brought into action. First of all, this is to increase the throughput capacity of the port elevator, bringing it up to 120 rail cars per day initially and then to 160. It also is necessary to raise the intensity of the operations at the grain transshipment complex on pier No. 7 by another 20 percent.

It is very important to continue the modernization of the piers of the port. These operations have begun at the Quarantine mole with the widening of the storage areas by reclaiming land from the sea and the modernization of piers No. 1 and 2. With the conclusion of these operations, the land in the port will have been increased by 70,000 square meters.

The labor and political enthusiasm induced by the decisions of the May 1982 Plenum of the Central Committee CPSU has found expression in the further development of socialist competition. The Odessa port workers working under the slogan "A Green Light for Foodstuff Cargoes" are striving to make their contribution to the food program of the USSR.

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## OCEAN AND RIVER

### NEW CONTAINER SHIP: BULGARIAN BUILT 'SIMON BOLIVAR'

Moscow MORSKOY FLOT in Russian No 1, Jan 83 pp 42-43

[Article by L. Dvorovenko, chief of the Latvian Shipping Company: "The Container Ship 'Simon Bolivar' " under the heading: "Fleet Equipment".]

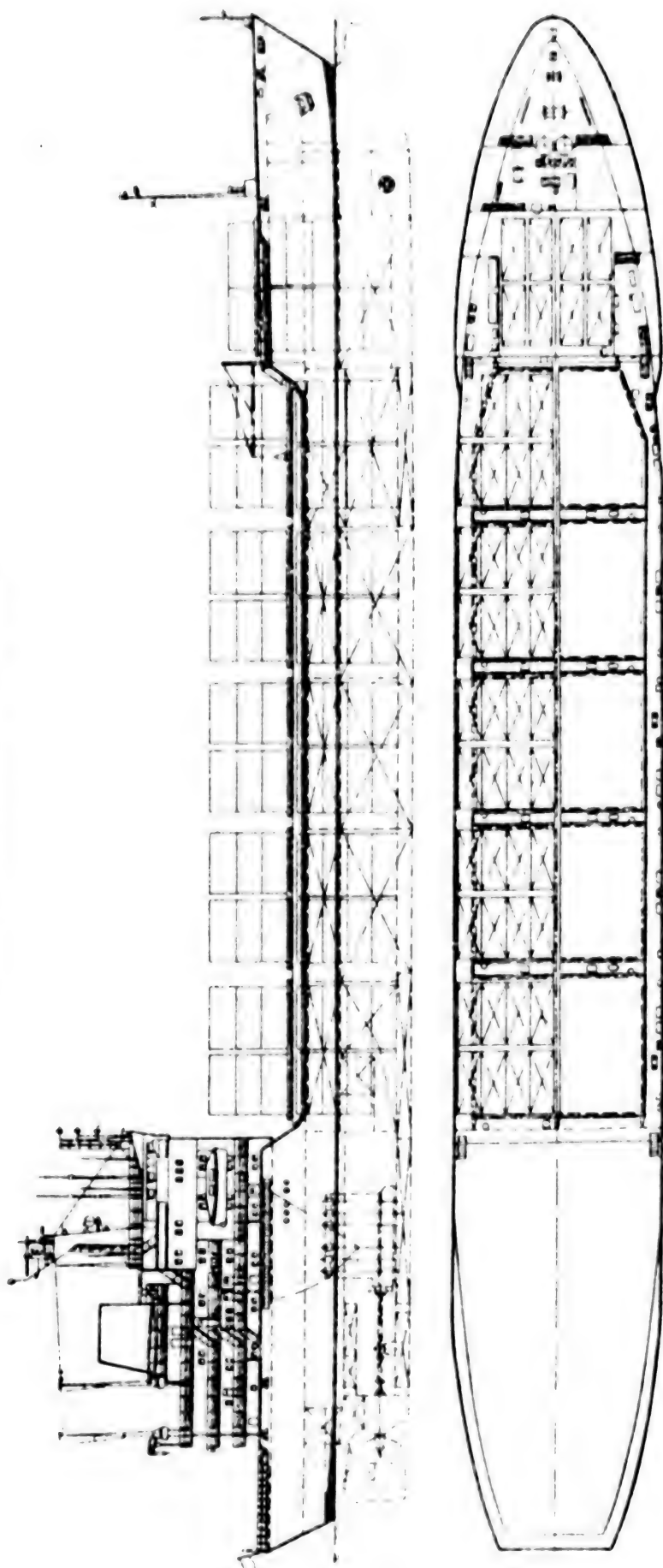
[Text] In 1982 the Latvian Shipping Company put into operation the container ship "Simon Bolivar". It is the first ship of a new series of container ships of the cellular type which are being built by the Bulgarian Shipbuilding Combine imeni Georgiya Dimitrova in Varna. The ship is for the transport of international standard, 20- and 40-foot containers types 1C and 1A, including 1C type refrigerated containers equipped with a refrigeration unit which operates off a shipboard electrical system. The ship has an unrestricted range of navigation including navigation behind an icebreaker and independent operation in brash ice.

The ship is constructed to the USSR Register of Shipping classification (container ship) and satisfies the requirements of the international rules and conventions.

#### Principal Characteristics

Length overall	148.57 m
Length between perpendiculars	135.90 m
Beam overall	21.00 m
Height of side	10.90 m
Draft to summer load mark	7.65 m
Deadweight with 7.65 m draft	9,141 t
Registered tonnage:	
gross	8,694 reg. t
net	3,816 reg. t
Main engine power	7.5 MW
	(10,200 hp
Speed, loaded	17.8 knots
Range of navigation	10,000 miles

General arrangement of the ship





The hull is of the "ice hull" type. It has a crew, single-deck, deckhold and three decks above the board, a tranom stern, bilge keels, and an elongated hull. The machinery compartment and a 15-level superstructure are located above the hull. Along the sides of the hull are two side tanks. The hull has a double bottom and in the cargo compartment area there are bilge keels. The try compartments formed by the double sides increase the stability of the ship.

The hull is reinforced by a combination of framing systems. A longitudinal structure system was adopted for: the bottom and double bottom, the decks (between the sides and the lines of the hatch openings), the sides, and the longitudinal bulkhead at heights from the intermediate platform up to the deck. In the remaining hull areas and the superstructure there is a transverse structure system. In the ends of the hull, the framing is reinforced against vibration loadings and in accordance with the requirements for ships operating in ice. The ship has bilge keels to reduce the amplitude of roll.

Transverse bulkheads divide the hull into ten watertight compartments. The forepeak and afterpeak tanks, the double bottom tanks in the cargo hold area, and the deep tanks along the sides of hold No. 5 are intended to receive water ballast. The total capacity of the ballast tanks is 3,088 m<sup>3</sup>. Deep tanks No. 10 on the port and starboard sides are part of the anti-heeling ballast tanks for correcting list and assuring the stability of the ship. By adjusting the ballast tanks, trim of the ship by the stern is held to a minimum.

The cargo and fuel supplies are stowed in the double bottom tanks in the forepeak and afterpeak and those adjacent to them in the hold, and also in the bottom tanks situated along the sides of holds No. 3 and 4. The fuel tanks are not fitted for the receipt of ballast water. The total capacity of the tanks for cargo and fuel is 1,113 m<sup>3</sup>.

For fueling operations, the ship has two side stations in the superstructure with access onto the air deck. In each station there is a control panel for the fuel and lubricating oil transfer pumps, light and sound signalling, gauge for level of fuel and lubricating oil in tanks being filled, telephone communication with the C.C. [central control station], and devices for preventing pollution of the sea during fuelling. The receipt of heavy fuel is possible at a rate not less than 200 m<sup>3</sup>/hr.

Vertical bulkheads for guiding and stowage structures divide the holds into cells. Holds No. 3-6 are equipped for loading 40-foot containers and also are fitted for the transport of 20-foot containers. The holds accommodate 246 containers (of the 20-foot size). Each hold has two hatches equipped with pontoon-type covers weighing about 20 tons each. Supporting seats and lugs with fasteners are welded onto the hatch covers for securing the on-deck containers which are arranged in eight rows across the width of the ship on all hatch cover areas of the two forward holds. In this, the extreme rows of containers are placed somewhat beyond the hatch cover dimensions and are supported on special stools welded to the deck. The full capacity of the ship is 412 (20-foot) containers when there are two tiers on deck or 490 with three tiers. Sixty-four of the containers transported on deck can be of the refrigerated

type. Eighty-one (30-foot) containers can be carried on deck in two tiers on 119 in three tiers. The total number of containers carried depends on their weights and on the different ways of accommodating them which are determined by the conditions necessary for stability of the ship. On-deck containers are reliably secured in the longitudinal and transverse direction by means of special devices consisting of adjustable chocks, stay-ropes and turnbuckles with braces, and quick-release hooks which exclude the possibility of self-release.

Special elevator platforms with electric drives are installed on deck to provide access for people to the on-deck containers.

The removal and installation of hatch covers and container handling operations on the ship are carried out by shoreside lifting facilities. The ship has only auxiliary load lifting gear for provisioning and repair tools. A 3.2-ton capacity telfer hoist is installed in the engine room trunk. Two electric cranes in the stern with 3.2- and 1.-ton capacities provide for loading provisions and shipboard supplies. The 3.2-ton unit also is intended for lowering and lifting the work-boat and work-float, and for serving the engine room trunk.

The ship has three Hall-type, 5-ton lower anchors including the spare, and a 2.5-ton Hall anchor in the stern. Anchor handling gear consists of three windlasses combined with automatic mooring winches. The combination windlasses are operated by controllers situated near them on the fore-castle and poop decks. Indicators of the length of paid-out anchor chain are installed at the controllers and, for the lower anchors, also in the pilot house.

For mooring operations there are four automatic electric winches, of which three are articulated with the anchor windlasses, each having a pulling force of 12.5 tons. Signals about the operation of the winches in the automatic mode are led out to the watch station at the gangway.

Two independent pump units control the type RL7-292-040-1 electrohydraulic steering engine which has a 40-ton-meter torque. The engine lays the streamlined scissored rudder from side to side ( $\pm 35$  deg.) in a time not exceeding 28 seconds. An "Aist" type automatic steering device is provided to control the steering engine. Rudder angle indicators are installed in the pilot house, the helm compartment, and the central control station.

A 3.8 kW (500 hp) thruster with electric drive is installed in a bow compartment. The thruster is controlled remotely from the pilot house, the wings of the bridge, and the central control station. There is an automatic system for the protection of the thruster machinery with light and sound signals led out to the control stations.

Lifesaving equipment consists of two type 3SSHMP37, plastic, 37-man enclosed lifeboats and two type RF-12R-U inflatable, 12-man liferafts. Lowering and lifting of the boats is done by gravity type davits and boat winches with type REL-63 electric drives having a pulling force of 6.3 tons. Besides the lifeboats and rafts, there are the plastic work boat with outboard motor and the plastic work float with 600kg capacity.

The main engine is built at the Breda shipyard in Italy. It is a type 6D 8-630-50 four-stroke, two-cycle, six-cylinder, turbocharged engine with a built-in scavenging pump. The engine is adapted to operate on all sorts of liquid fuel (HFO). It can run up to 3,000 seconds Redwood I at 100 deg. F, and it develops a maximum operational power of 7.5 MW (10,200 hp) at a speed of 2.33 revolutions per second (140 rpm).

The auxiliary electrical plant consists of three identical type 6D 8-630-50 alternating current (300V, 50 Hz) generators with a power of 630 kW. Each is driven by a Esogelak-Sulzer type AL 25/30, four-cycle, trunk type, nonreversing, turbocharged engine. Each engine has a power of 552 kW (750 hp) at a speed of 11.0 revolutions per second (750 rpm). For emergency electric power, in a superstructure compartment on the poop deck a 150 kW type 3SED-102-50 generator is installed which is driven by a four-cycle, nonreversing, supercharged, type AVA-140 engine having a power of 132 kW at a speed of 16.07 revolutions per second (1000 rpm). The engines of the auxiliary electrical plant operate on diesel fuel. Fuel for the main and auxiliary engines is cleaned by type MAPY 309-B24 self-cleaning separators, two of which are installed in the system for preparing heavy fuel and one in the system for diesel fuel. A Eurocontrol Company type VISK-21R automatic viscosity regulator maintains the viscosity of the heavy fuel within prescribed limits. The fuel for the auxiliary engines is completely self-contained. The power plant has been provided of utilizing the heat in the cooling water of a working auxiliary engine to warm up an engine held in reserve.

All shipboard requirements for electrical power when underway with refrigerated containers are provided for by one or two generators depending on the number of containers connected to the shipboard system. When underway without refrigerated containers but with the operation of the airconditioning system, electrical requirements are provided for by one generator.

The main and auxiliary engines are equipped for remote control from the central control station and with automatic controls for control from the pilot house. Concentrated in the central control station, which is situated on a platform on the port side of the engine room, are the means of control, the monitoring instruments, emergency alarms for the main and auxiliary machinery, and the emergency distribution panel.

The type FAM-S automatic remote control [DAU] system for the main engine built by the Swedish firm ASEA is an electronic and pneumatic system. It provides for starting and regulating the load on the main engine in accordance with two programs; namely, normal and emergency. A "Signal-3" system of emergency stop is built by NRB [People's Republic of Bulgaria] is triggered automatically when there is a deviation from normal of the principal operating parameters of main engine or auxiliary machinery. Light and sound alarms are sent into the central control station, the pilot house, the engine room, the cabins of the engineers, the crew's mess, the wardroom, the passareways, and the fore-cabin. The electrically powered means of automatic control, monitoring and signalling receives power from the main and emergency distribution panels and from a battery. An uninterrupted

The compressed air for the compressor is taken from the air conditioning system and is supplied to the 24-volt power supply. The pressure in the compressed air bottle is 3 MPa.

The auxiliary and waste heat boilers fully provide for shipboard steam requirements. A type EK-2000/1 auxiliary, vertical water tube boiler with an output of 2.5 tons per hour of saturated steam at 0.7 MPa pressure operates on the heat from the cooling water up to 300 seconds Redwood 1 at 100 deg. F. A type EKP-2000/1 waste heat, vertical, sectioned water tube boiler with forced circulation of water and with a separately installed steam separator, fully satisfies shipboard requirements for steam underway. The auxiliary and waste heat boilers are equipped with devices automatically controlling their mode of operation and regulating their steam output, with a protective system and on the principal parameters, and with instruments for monitoring and emergency alarm. The automatic control of the operation of the boiler allows their operation without a watch.

To reliably supply fresh water, there is a type D40 vacuum evaporator plant with an output of 10-15 tons per day which operates on heat from the cooling water. The plant is equipped with a light and sound alarm system which is triggered by an increase in the salinity of the fresh water and which automatically changes the flow direction returning the condensate to the evaporator.

The compressed air system for power plant needs consists of two electric, two-stage type 202-11 compressors delivering 140 m<sup>3</sup>/hr at a pressure of 3 MPa and a type 202-750 KRE booster compressor with an output of 35 m<sup>3</sup>/hr at a pressure of 4 MPa. The compressors operate automatically. Remote control of the compressors from the central control station also is provided. For the breathing needs, a type EK-16/11 compressor is used with an output of 140 m<sup>3</sup>/hr at a pressure of 0.7 MPa.

The stern tube bearing is a cast iron sleeve filled with white metal and lubricated by oil under a pressure created by gravity. The stern tube is equipped with a Kambechi-LIPS - 68, type 630 MK11, gland seal.

The ship's propeller is a 4-meter diameter fixed pitch propeller made from high-strength bronze.

The refrigeration plant for cooling the provision lockers and maintaining the at an assigned temperature, consists of two type APK-1286-31.2 compressor and condenser units having a cooling capacity of 7,000 kcal/hr each. The output of the compressors is regulated automatically so that each of them operates no more than 18 hours per day. In the principal mode of operation, the refrigeration plant is fully automatic. A closed loop for cooling water from the aftertank is provided for operation of the plant when the ship is in drydock.

The living and service compartments in the superstructure are equipped with a double-batch air conditioning system delivering fresh air on a basis of not less than 33 m<sup>3</sup>/hr per man. The system is served by two automated, type K 0.711-5 air conditioners delivering 6,700 m<sup>3</sup>/hr and two type AF 232 com-



The sewage treatment system is of the closed type. The ship contains a type IRE biological processor with manual and automatic control. General feed signals about the function of the plant or deviation in operation are fed out into the central control station.

A type OG-400 incinerator of the Golar firm is installed for burning refuse and the waste products from the cleansing of fuel and lubricating oil. The capacity of the incinerator in burning solid waste is 100 kg/hr, and for liquid waste products from the fuel and lubricating oil separator is 80 l/hr. For the delivery of garbage and solid waste from the poop deck to the incinerator which is installed in the engine room, a refuse chute is provided.

The ship is fitted with modern electronic and radio navigation and communications gear assuring safe navigation and uninterrupted communication with the shore. There are two radar stations, an autopilot, radio navigation receiver, radio transmitters, printers, a radio station, and other electronic and radio navigation equipment.

Quarters are provided on the ship for 30 crewmen, 4 trainees, and a pilot. All crew members are accommodated in single-berth cabins, and the trainees in four-berth cabins. For the senior command personnel there are equipped cabins. There is a medical unit and there are lounges for individual occupation in leisure hours. The composition, finishing, and equipping of the living and service compartments has been carried out on the basis of modern requirements.

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# BRIEFS

SHIPOWNERS MEETING—Zhdanov—A meeting of the technical commission of the International Association of Shipowners was held in Zhdanov. The participants were chief engineers of steamship companies from Bulgaria, Hungary, East Germany, Cuba, and Poland. The Soviet Union was represented by the Azov Maritime Steamship Company. The meeting reviewed questions of rational use of fuel and energy resources on the ships of CEMA countries, technical operation and equipping of ships, and preventing contamination of the seas and oceans. A plan of work for the technical commission in 1983-1984 was ratified. Participants at the meeting exchanged fuel conservation know-how. [By V. Targanshchuk] [Text] [Moscow VODNYY TRANSPORT in Russian 2 Nov 82 p 4] 11176

NEW RIVER SHIP—Kiev—The collective of the ship building and repair yard has begun construction of a Zaporozhets class design No 559 diesel ship. It will be the beginning of a series of ships designed for work on the rivers of Belorussia. The ship has a cargo capacity of 1,725 tons, which can be increased to almost 4,000 with attached vessels. The new ship, which will begin carrying cargo in the 1983 shipping season, has been given the name Mozyr' in honor of the ancient city in the Pripyat' region. [Text] [Moscow VODNYY TRANSPORT in Russian 11 Nov 82 p 1] 11176

NEW SHIP LAUNCHED—Rybinsk, Yaroslavl Oblast—The collective of the Rybinsk Shipyard imeni Volodarskiy has commissioned its latest river-sea class dry-cargo diesel ship ahead of schedule. This event is doubly significant for the shipbuilders. In the first place, this ship is the last one in the 1982 plan. In the second place, launching it ahead of schedule was one of the obligations assumed by the collective of the yard in honor of the 60th anniversary of the formation of the USSR. [By Yu. Belyakov] [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Dec 82 p 1] 11176

MODERNIZED DIESEL SHIP--Leningrad--The shipbuilders of Leningrad have turned over the modernized-loading diesel ship "Shestidesyatiletiye SSSR" to the Azov Maritime Steamship Company one month ahead of schedule. The new ship is markedly different from its predecessors. Its hull is 13 meters longer, which increases cargo areas by 20 percent. The modernized diesel ship can carry an additional 100 cars or 30 containers. Representatives from many republics of the country contributed to building the ship. Instruments and equipment for it were supplied by enterprises in Lithuania, Latvia, Belorussia, and Turkmenistan. By broad use of progressive technology and brigade forms of labor organization the shipbuilders at the yard imeni Zhdanov were able to cut construction time significantly. [Text] [Moscow TRUD in Russian 9 Dec 82 p 1] 11176

NEW TANKER LAUNCHED—The fleet of the Caspian Maritime Steamship Company has been enlarged by addition of the tanker "General Sabit Rakhimov." The ship was built on the dock of the Volgograd Shipyard. The tanker has a cargo capacity of 4,500 tons. [Text] [Moscow EKONOMICHESKAYA GAZETA in Russian No 50, Dec 82 p 3] 11176

NUCLEAR-POWERED LIGHTER CARRIER—Kerch—The first sections of an ocean-going lighter carrier with a nuclear power plant have been welded in Kerch at the Zaliv Shipyard imeni Butoma. The vessel will be able to take on more than 70 lighters, non-self-propelled vessels with drafts of up to 1.5 meters and cargo capacities of 500 tons, and put them into the water at any point along the coast. The first ship is designed to sail in the Arctic. Leningrad designers provided it with a powerful nuclear "heart" and an especially strong hull. "There are few large ports on the Arctic coast," says A. Voloshin, chief construction engineer at the Kerch Zaliv yard. "The ship does not need them either. The lighter carrier puts the lighters in the water and goes on, leaving them in the care of a local tug. It picks them up on the return trip." The latest instruments and navigation equipment will be used on the lighter carrier. Designers have taken care with conveniences for the crew. The design envisions single cabins with air conditioning, an enclosed swimming pool, and a sauna. [Text] [Moscow PRAVDA in Russian 18 Dec 82 p 2] 11176

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## PROBLEMS OF TRANSSHIPPING FROZEN COAL

MELANOV NORDENF 1191 In Russian No 10, Oct 82 pp 14-15

[Article by S. Lisovenko, captain of Zhdanov port: "Unloading Frozen Coal"]

[Text] Unloading coal from railway cars during the winter is one of the port of Zhdanov's most pressing problems.

The winter months of the years 1975-1980 saw an average of 51,000 man-hours required to unload frozen coal manually. Seventy men were diverted to this duty each day. Annual losses for this period ran to more than 3400 car/hours, 39 per cent more than norm-established times being required to unload each car. Frozen coal, moreover, completely excludes the possibility of using car dumpers as well as, accordingly, the port's coal loading facility.

This 30-40-per cent reduction in the port of Zhdanov's winter unloading capacity is forcing the Ministry of the Maritime Fleet and the Ministry of Railways to divert shipments of Donbass coal through other ports some 800-1000 km from the point of extraction.

Chernomorniprojekt [expansion not given] and the port of Zhdanov spent several years looking for a way to restore the looseness of frozen coal in railway cars arriving at the port for unloading.

With the objective of speeding up the unloading process a method of heating in special thawing facilities was recommended, which involved the use as heat-carrying agent of exhaust gases from turbojet engines which had outlived their service usefulness.

These turbojet thawing facilities offer advantages over those employing conventional convective, infrared or combined systems. They are more efficient; they require less space, are inexpensive to build and simple to operate, easily readied for start-up, simple to preserve, as a rule operate in an automatic control mode and do not depend upon external heat and electric-power supply conditions. The great efficiency of a thawing facility using an aircraft engine is due to the high density of the heat flow.

While, for example, the thawing facilities using aircraft engines have a heat flow of 1500 kcal/h·m<sup>2</sup>, the flow in the convective warming systems with steam heaters used in industry is only 500 kcal/h·m<sup>2</sup>. It was therefore decided to build a thawing facility into which a VK-1 jet engine would be installed. This decision was governed by the

that during shipment from the Donbass, the coal does not freeze completely, but rather only around the sides and bottom of the cars to a thickness of from 200 to 500 mm. When the cars are heated by exhaust gases from the jet engine the coal easily breaks away from the sides and bottoms.

The thawing facility was built at the port at the beginning of 1982. It consists of the following components: a semitunnel structure with pipe for distributing the hot gases, a machine unit housing the VK-1 jet engine, a section in which an NSI pump has been installed, an electric motor and automatic fuel system and fuel storage tanks.

The semitunnel structure consists of a straight section of railway 72 m long (long enough for 5 cars) enclosed on both sides by reinforced concrete walls approximately 3 m high. Running horizontally along the inside of each wall are two pipes with openings directed toward the gondola cars. These pipes carry the hot exhaust from the jet engine.

The space between the sides of the gondola cars and the walls is covered by hinged sloping metal baffles which prevent the flow of hot air from escaping to the outside.

The machine unit is built with sound-absorbing wall insulation. The second floor of the machine unit houses the facility's control console.

Experimental operation of the facility during the winter of 1981-1982 provided an opportunity to determine the optimum regime of jet engine operation. At air temperatures down to  $-15^{\circ}\text{C}$ , for example, with 30-40 per cent of the coal in a car frozen, effective heating was achieved at 6000 rpm for 10 min. Sufficiently high output gas flow rates and temperatures (as high as  $200^{\circ}\text{C}$ ) were obtained under these conditions. To thaw the coal requires approximately 650 kg/h of fuel. The facility can process 250-300 cars a day.

After heating in the thawing facility the coal was easily unloaded with clamshells. No manual labor was required to clean the inside of the car.

Exhaust temperature around the axle boxes and rubber brake lines were monitored continuously throughout the thawing process. Temperatures here did not exceed  $50^{\circ}\text{C}$ . Noise-level measurements made by the sanitary-epidemiological station showed that they remained within norm-allowed ranges both in the operator's work area and in the vicinity of the facility itself.

Efforts are now under way to find ways to reduce fuel consumption, to use cheaper grades of fuel and to improve procedures employed in moving and unloading the cars.

It is anticipated that the future will see recommendations for optimizing heating and jet engine operation developed with respect to the length of time a car has been en route, outside air temperature and degree of freeze in the load.

According to preliminary computations, the economic gain derived from using this facility in the port alone will run to more than 200,000 rubles.

Considering the comparatively small capital expenditures required to build a thawing facility with a jet engine, the relatively short period of time it takes to build one and the great effectiveness of this kind of facility, it can be recommended that ones like it be built in other ports as well.

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MISCELLANEOUS

ROUNDTABLE ON IMPROVING LONGSHOREMAN-RAILROAD WORKER COOPERATION

Moscow GUDOK in Russian 8 Dec 82 p 3

[Roundtable discussion recorded by S. Yamont, special GUDOK correspondent, among longshoremen and railroad workers in Novorossiysk: "Business Cooperation, Reference Point of the Search"]

[Text] How can coordination of the actions of allied workers be improved, how can business contacts be strengthened and how can work quality be improved? These and other questions were discussed at a roundtable meeting, which the editorial board of GUDOK, jointly with the station party bureau and the party committee of the country's largest port, conducted at Novorossiysk. Party and Komsomol leaders of the station, port, rail car depot, managers and leading workers of these enterprises and representatives of the rayon Komsomol committee and of the staff of KOMSOMOL'SKIY PROZHEKTOR participated in the conversation.

The deputy station chief for import-export shipments Vitaliy Semenovich Chernousov opened the roundtable discussion.

"Problems of strengthening cooperation at the Novorossiysk terminal are being resolved creatively for many aspects. We are adopting the cooperative use of equipment. The port leases part of the switching locomotives from the station and deploys the rail cars along the docks itself. This also guarantees clear delimitation of the obligations for preservation of freight and a sharp reduction of rail car idle time. Before this form of cooperation was introduced, the rail car idle time at the port comprised 22.9 hours, while now it is 6.64 hours. This is from the results of the last 10 months.

"Such an innovation as quality sheets was also effective. In signing the sheets, the longshoremen's brigade guarantees that everything that it has loaded corresponds fully to formulated documents and that all conditions to prevent spoilage of freight en route have been fulfilled.

"I feel that increasing the quality of joint work is the main task which we now face. The fact is that one party--we the railroad workers--now bear



...the responsibility for the results of our work with the longshoremen. The responsibility of all workers participating in transshipment of freight, each rail car's results, should be increased. After all, the longshoremen sometimes do not observe the elementary loading rules. And this results in the most severe consequences for the railroad workers and the national economy and results in enormous losses.

"The quality of rail car preparation is of especially important significance to accelerate freight handling. I would like to appeal to the workers of the rail car depot present here. You cannot permit rail cars unsuitable for loading to leave the preparation terminals. And primary attention should be given to train cars.

"Yet another important problem now facing our joint work with the longshoremen continuous over a 24-hour period--still remains unresolved. For example, imported goods now require practically 16 hours for loading due to the nonconformity of the longshoremen's and examiners' work schedule. Let us think how to bring the working time up to at least 20 hours."

M. Guchok, senior examiner:

"We have really not yet learned how to conserve and save working time. The specialists and station and port management should probably think over how to combine the work schedules. I would like to talk about something else--about losses of time which occur due to poor organization and poor working conditions of longshoremen. I will cite an example. Yesterday people were assembled from different regions of the port to load rice. But no working conditions were created for them. No lighting of the work sites was provided and no standard tommy bars were prepared. And when this was reported to the dispatcher, he said, 'Let them go look for both carriers and wire.' What a loss of time!"

A. Dolotov, brigade leader of the Komsomol youth brigade of longshoremen-equipment operators:

"The examiner is not interested in increasing the longshoremen's labor productivity. It is easier for him and even more advantageous when we longshoremen are loading a single rail car rather than three simultaneously, although we have this capability. In this case the examiner will have no errors in counting and there will be no complaints. I think that he would have a different attitude toward the work if he had to count how many rail cars he loaded. But here is the way it is now. The examiner meets the longshoremen halfway, trusts them and authorizes them to load three rail cars immediately. Although he has taken more concerns upon himself, no one will thank him except us and if complaints come in, it will not affect our bonus for rapid loading, but the examiner will suffer the loss. We will also have idle times when the examiner formulates the documents for the rail car.

"Is there any way out of this situation? We in the brigade thought over how to increase labor productivity and how to make it so that the examiner not delay the tempo of our work. And we concluded that there is one way out: the

longshoremen should take on themselves the examiner's responsibilities. We suggest as an experiment that five persons from our brigade be trained in the work of the examiner."

V. Chernousov:

"This is a very interesting idea Comrade Dolotiy! And not only in acceleration of our joint work but in increasing the material responsibility of the parties participating in shipments. Since the existing situation was adopted in 1958, the port as shipper is fully absolved of material responsibility. The volume of shipments, especially of valuable cargo, has now increased ten-fold. We are working by the direct ship-rail car version. But the technology of examiner operations have remained as they were before. It not only hinders and reduces the efficiency of this progressive method of transloading goods, but it also creates conditions for abuses. One department should bear responsibility for preservation of goods from hold to rail car."

V. Babkin, senior port engineer:

"Yes, but how can we bear material responsibility for preservation of goods if the longshoremen do not have their own representatives at the unloading points? The accuracy of accounting during loading is guaranteed in Anatoliy Mikhaylovich Dolotiy's proposal, but not in unloading."

A. Stepanets, secretary of the port Komsomol committee:

"Perhaps it is better to think about attaching the examiners to the longshoremen brigades?"

M. Guchok:

"This is unrealistic. First, because the longshoremen do not always load box-cars. They frequently work on the ship, in unloading, on open rolling stock or are engaged in housekeeping. What are the examiners to do in these cases? And second, the longshoremen work on 8-hour shifts, while we work on 12-hour shifts. There are many women among the examiners who arrange this very work schedule. I believe that half our people would simply submit resignations if they were transferred to a different schedule. And everyone knows how acute the problem with examiner personnel is."

V. Chernousov:

"Anatoliy Mikhaylovich, if the longshoremen maintain the technical minimum among us and also become examiners, would it not embarrass you that, as our workers, they will be materially responsible persons?"

A. Dolotiy:

"Another time, but the longshoremen cannot be reprimanded if they are not daring."

V. Chernousov:

"Then we will consider your proposal and in the name of the participants of today's discussion we will request the port management and the administration of the Northern Caucasian Railroad to participate in conducting this very valuable experiment."

N. Kiselev, secretary of the Junction Komsomol Committee:

"The present business contacts can be organized and we can convert from mutual complaints to mutual understanding, as shown by experience, through unified dispatcher shifts that combine longshoremen and railway workers. Both we and the port Komsomol committee should primarily think of how to create such a Komsomol-youth shift. And something else. We are not exhausting the search for new forms of creative cooperation. The task of our Komsomol organizations is to recruit young people as widely as possible in this search and to give the green light to everything valuable and advanced."

V. Mel'nikov, chief of the rail car maintenance station:

Many valid complaints were made here against the rail car workers: I will not dwell on all the misfortunes which affect in one way or another the quality of our work. I will talk only about the one, in my view most acute problem. Half the time lost for preparation and repair of a rail car goes for opening and closing the doors of the empty car. And these laborious operations were previously performed by freight service workers. Until this problem is resolved, the problem of the quality of rolling stock preparation will not be solved."

I. Pozdnyakova, rail car inspector:

"The effectiveness and quality of our work is directly dependent on clear interaction with related workers. Unfortunately, we do not yet have this interaction. The switching dispatchers in the western and central regions of the port, ignoring our remarks, turn grain cars over for loading raw sugar. For example, 12 grain cars were loaded with sugar during the past few days. But do the longshoremen know how difficult it is to prepare a rail car for grain?"

V. Cherednikova, secretary of the rail car depot Komsomol committee:

"I feel that Lyudmila has touched on a very important problem. We know little about each other's work. But this is not the only thing. We and the related workers have many common problems which we now each solve by ourselves. There is no common interest and we also have different indicators. The party committee and party bureau, trade-union committees and Komsomol committees of our enterprises should apparently think together how to recruit specialists and finally how to define a unified final indicator according to which the entire railroad terminal and port could operate."

V. Polovinkin, secretary of the Komsomol raykom:

"The question of searching for new forms of cooperation of related worker collectives was quite correctly raised today. But I feel that we must creatively

develop forms that have already been found and that have justified themselves. Two years ago, a joint party for the young port and railway terminal workers was held. Everyone remembered that party for a long time. Why have not these parties that contribute to solidarity of collectives become part of the system? The Komsomol organizations have not shown initiatives in another good matter as well. Many talk about the massive grain shipments that should be taken under daily Komsomol inspection. But the conversations have only remained that.

"It is time to turn from words to action. The permanent post of 'Komsomol searchlight' should be created at the rail car preparation terminal and the council of secretaries should activate the work. There should be more joint Komsomol meetings, honoring of the winners of the competition and cultural and mass measures. In short, we and you have many important and necessary matters before us."

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